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PEDIATRICS

Vol. XVIII JANUARY, 1906 No. 1

ORIGINAL ARTICLES

INFANT FEEDING.

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One of the great problems that is constantly confronting the general practitioner is, "How shall I feed the baby?" We sometimes forget, I fear, that what we really want to know, is, not how shall *the* baby be fed, but how shall a baby be fed, for each infant is a law unto itself. Very seldom will any two require the same food management. There are so many factors that enter into the solution of this problem that it is, at times, not an easy one to solve. Even among those who are leaders in this particular department of medicine there is a wide diversity of opinion upon important questions. Old ideas that were supposed to be taken out of the realm of discussion are being recast or entirely discredited. This, however, does not deny the truth that important advances have been made in infant feeding, particularly in our knowledge of the preparation of the food that is to take the place of mother's milk when, from any cause, this cannot be used. We have a more thorough comprehension of the chemical, bacteriological constituents of the food given, and their effects upon the child, immediate and remote.

It is a statement no one will deny, I presume, that except in rare instances, the mother's milk is the most suitable and perfect food that can be provided for her young offspring; and she who can and will not allow it this nourishment commits a crime (for it can be little else) for which there is neither excuse nor palliation.

There are times, however, when either from some chemical defect in the milk supplied, or from the physical condition of the mother, from her death, or from disease of the infant, when this cannot be done, and some substitute must be had, either permanent or temporary.

The importance of this subject is further augmented when we stop to consider that intimately associated with infant feeding are the diarrheal diseases so largely preventable, if due attention is paid to proper feeding. Do not infer that I think all the intestinal disturbances of early child life are due to this cause, but certainly by far the greater portion of them are, only a small minority being caused by some special micro-organism, like the bacillus coli-communis or the bacillus of Shiga.

The question, then, that presents itself is, what shall it be? The food of the infant must fulfill a dual purpose:

First, It must contain those elements in proper proportion that keep up growth and tissue waste.

Second, Those that maintain the temperature of the body. It need hardly be said these are intimately associated and really inter-dependent.

In cow's milk, suitably prepared, we have the nearest approach to it of anything attainable by the masses. I say attainable by the masses, because from a commercial standpoint it must be cheap and universal. A good wet nurse, free from disease, and about the age of the mother, is, of course, the very best that can be had; but with a large majority of those who have to provide this substitute a wet nurse is out of the question.

To repair tissue waste and provide for the growth of the child, we have in the milk mainly the proteids, and to keep up the temperature of the body the saccharine and fatty matters. These, however, do not exist in the same proportion in the breast milk, and in that of the cow, especially the casein, which is greater in the former than the latter and more difficult of digestion. The proportion of sugar is greater in man than in the cow; in the former the reaction is alkaline, while in the latter it is slightly acid.

CONTAMINATION.

Mother's milk is always fresh and sterile, while the opposite is usually true of cow's milk. In cow's milk, its age and repeated handling are sure to result in contamination, and the amount of contamination is in direct proportion to the length of time since the milking and the number of times it has been handled.

The sources of contamination are numerous; many of them can easily be eliminated, others are more difficult.

The lactic acid bacteria so frequently found in cow's milk comes from the teat of the animal, while the pathogenic bacteria find ingress through the medium of the water used in cleansing the vessels in which the milk is received; the putrefactive bacteria come from the filth, manure, etc., on the cow's udder. The importance of strict cleanliness in milking the cow and the handling of the milk becomes at once apparent.

Add to this the adulteration which it is almost sure to undergo, and it requires no mental effort to picture something of its condition, a breeding place for all manner of pathogenic germs. As physicians our attention is attracted almost daily to epidemics of typhoid and scarlet fever, as well as diphtheria, transmitted through infected milk. It seems as well nigh impossible for the average milkman to be honest as it is for a politician to be truthful. A man found guilty of selling adulterated milk should not only be fined, but imprisoned. When to all this is added improperly cleaned cans, unsanitary condition of the dairy, as well as the vigorous and continuous churning milk receives in being conveyed about the city, developing poisonous alkaloids, it is not at all surprising that so many sicken and die who use it, but that so many get well. Every dairy should be rigidly inspected by a competent health official, not only to ascertain the condition of the herd as to the health of the individual cow, and as to cleanliness of surroundings, quality of food and water used, but as well the health of every member of the dairyman's household. The milk should not be inspected at the dairy alone, but samples should be taken from the wagons on their daily rounds to the private consumer. This order should be imperative to the milk inspector.

The profession had hopes, and for a time was led to believe, that by boiling the milk any germs of disease that it might contain would be destroyed and at the same time its digestibility be preserved. While by this process the former undoubtedly takes place, clinical experience has demonstrated the fact that its digestibility, and in consequence its nutritive value, was seriously interfered with by sterilizing it at 212 degrees Fahrenheit. Heating the milk, stopping short of the boiling point, or about 165 degrees, renders it sterile, while the coagulation of the albumenoids does not impair its nutritive properties.

Mother's Milk the Standard of Comparison.

Having stated elsewhere that breast milk was the infant's natural food, it would be proper to suppose that in the preparation of an artificial diet or substitute, this would form the standard of comparison. I think it is equally as well conceded that, next to mother's milk, cow's milk, properly prepared, is the best, and that in its modification it should be made to conform as nearly as possible to that standard. An analysis of breast milk shows it to contain the following as its chief constituents and their relative proportions: Proteids, 2; fat, 4; sugar, 7. In cow's milk we have proteids, 4; fat, 4; sugar, 4. The composition of breast milk varies greatly in the same individual at different times and widely in different individuals. Sharpless and Darling, in a very recent issue of the Boston Medical and Surgical Journal, give an analysis of 117 specimens, with the following results: Proteids, 1.34; fat, 2.91; sugar, 7.01. What has been said of human milk is true in as great, and possibly a larger degree, of cow's milk. It will differ at times in the same cow, but very widely in different breeds of cattle. For instance, it is a matter of common knowledge that the Jersey gives a milk much richer in the fats or cream than the Holstein or mixed breeds of cattle. So that to be scientifically accurate, we must take into consideration the breed of cattle producing the milk. At first thought this would seem to bring about great complexity rather than simplicity. This, however, is more apparent than real, for the greater portion of us have to deal with the milk of ordinary mixed breeds of cattle, so that the proportions I have given may be accepted as a good working basis in both breast milk and the milk of the cow.

Theoretically, then, the modification of cow's milk would seem to be an easy proposition—simply one of addition and subtraction, but practically it is not so easy as it at first appears, for every baby's stomach is a law unto itself, and, like fitting a garment, it is one of cut and try.

It was at one time supposed that the milk from one cow was better than the combined milk from several cows, but this is no longer considered essential, because the milk from one cow is as liable to vary from day to day, and possibly more so, than the milk from an entire herd.

By reference to the foregoing table of relative constituents it will be seen that the proteid of the cow's milk is very much in excess over that of woman's milk and to make them bear the normal relation the milk must be diluted one-half for the new-born babe. As I shall say elsewhere, it is well to commence with a low proteid, hence it is wise to dilute the milk even more than the amount indicated. However, while doing so, we at the same time dilute the fats and sugars, and these must be added. If gravity cream is used the amount of fat can be regulated with a fair degree of certainty and it only becomes necessary to add sugar. If plain milk is used the cream must be increased.

The primary object in diluting the milk, is of course, to reduce the amount of the proteid as this is difficult for the stomach of the young infant to digest. The fats and carbohydrates are just as essential to the normal growth and energy of the child as the proteid and their proper amount can not be ignored unless to the serious detriment of the infant.

The Best Diluent.

The question that now logically presents itself is, what is the best diluent?

It is well known that the casein in the cow's milk is converted into a large, firm mass in the infant's stomach, making it impossible for the digestive ferments readily to come in contact with it. As a result we are sure to have diarrheal disturbances of greater or less severity, mal-nutrition and the like often terminating fatally. The selection of the best menstrum to prevent this condition of affairs becomes a vital one. As to which one is the best there is a diversity of opinion. Some prefer plain water previously boiled with the addition of lime water, many some cereal infusion, while others like certain foods, with which the market is liberally supplied.

Rotch and White, of Boston, as well as others, are claiming for whey superior properties as a diluent, contending that the coagulum is finer, less tough and consequently more easily digested, therefore more suitable for infant feeding than anything that can be used. They, however, use cream in place of ordinary milk.

The two diluents most frequently used are water and some one of the cereal infusions, my own preference being for the latter, prepared in the following way: A level tablespoonful of wheat or barley flour is mixed into a paste with water, when it is boiled for ten or fifteen minutes, after which it is strained through a piece of cheese cloth. The boiling causes the thorough disintegration of the starch granules. What is lost by evaporation should be replaced, so that a full pint is had. To this is added a tablespoonful of milk sugar. If doubt exists as to its purity, or if it can not be had, cane sugar may be substituted, but a slightly less amount.

Two parts of this mixture and one part of the upper eight ounces of good milk which has stood for six hours, will represent the proportions in which they should be used for a new-born babe. A pinch of salt may be added and is beneficial. About two ounces of this mixture should be used at each feeding for the first few days, then three ounces, then four. The amount of the fat may be gradually increased until at the end of the third or fourth month we may make it one-half, instead of one-third as at the outset, assuming that we still use the ten per cent. cream or the upper one-third of quart treated as mentioned before.

I am firmly convinced that some one of the cereal infusions, more completely separates the particles of casein, thereby making it more easily digested than any other that we can use, unless it should be whey, and objections can be urged against its use. The casein was certainly placed in the milk for some specific purpose, to serve some end in the child's growth and development and its entire removal can not but be detrimental. The addition of limewater to cow's milk is urged because in this way it can be made alkaline to correspond more nearly with human milk, but if more than five per cent. is added it will neutralize the gastric secretions of the infant's stomach and thereby prevent digestion. The various foods on the market should never take the place of milk in the infant's dietary. They should not be used except as milk modifiers.

If milk is put in a clean, well stoppered bottle or fruit jar with a screw top and placed on ice and allowed to stand, the cream or fat will collect on the surface and will decrease in richness from the top toward the bottom, and will, of course, vary in the length of time it is allowed to stand. By pouring or dipping off from the upper portion, the amount of fat to be used at each feeding can be fairly well gauged.

As an example: A quart of milk is allowed to stand for six hours, the upper ten ounces will yield ten per cent. of cream, if allowed to stand eight hours the upper eight ounces will yield twelve per cent. of cream, if allowed to stand ten hours, the upper six ounces will represent sixteen per cent.

As I have said elsewhere, it must be borne in mind that not only the quantity of cream but also the amount of fat, proteid and sugar, each will contain, will depend upon the breed of cattle from which the milk is derived; some being much richer in these constituents than others. Human milk also changes to meet the changed conditions of the infant brought about by the increase of growth and function.

In feeding an infant it is always best to commence with a low per cent. of proteids, lest the digestion be disturbed. Allow me to return for a moment to the diluent. The objection that is urged against the use of cereal infusions is that they contain starch and that this should not enter into the infant's dietary. This objection is based on the assumption that the glands about the oral cavity, as well as those of the stomach and bowels, do not secrete a substance capable of transforming starch into sugar, hence the infant is unable to digest and assimilate it. Jacobi says that very young infants can and do digest starch, that it is wrong to assume that no saliva is secreted even at a very early age, that the parotid and sub-maxillary glands of a healthy three-months old fœetus contain a ferment capable of doing this.

Schiffer has proved such transformation in a babe two hours old. From this it will be seen that the objections urged against the diluents containing a small amount of starch rest upon no real, substantial basis. I have said "a small amount of starch." It is conceded by all that large amounts of starchy foods, no matter of what kind, should not be given the infant. Putting it conversely then, it is the abuse and not the use that is to be condemned.

However, the fact remains that no amount of modification, no matter how skilfully done, can convert cow's milk into the breast milk of the mother. The proteid of the former differs radically from that of the latter, being in the cow's milk four-fifths casein while in the mother it is one-third, the remainder being albumin and globulin. The fat in the cow's milk is of a different composition from that of the mother. The amount of fat is less, the specific gravity lower, and contains a larger proportion of butyric acid from which the acetone bodies are formed.

The amount of milk given at each feeding will, of course, vary with the age of the child, ranging from an ounce and a half at birth with intervals of two hours to six to eight ounces at nine months old with intervals of four hours. The quantity given at each feeding should be carefully inquired into in all cases of diarrhea; in addition to this the amount of the proteid as well as the fat should be looked after. All will usually be found in excess. Children are often given more food than is necessary rather than not enough and yet the latter will often be encountered.

Mothers, especially young mothers, think every time the baby cries it is hungry and food is administered. This is a grave error. A tablespoonful of pure cold water would be better, particularly during the heated season.

As soon as the child has had sufficient food for one meal, the bottle should be removed from its side. Too often the child is allowed to go to sleep with the nipple in its mouth, and through its half waking moments it will take a few pulls at the bottle and drop to sleep again. In this way the stomach is kept full of milk, some of it partly digested while the remainder is not acted on by the gastric juice. To direct attention to a duty so plain as that just mentioned seems uncalled for and out of place, but it is surprising how frequently it is disregarded. The nursery should be supplied with the most careful and minute details as to the preparation of the food as well as its manner of administration. As intimated before, the sources of contamination are so numerous both before and after it is received at the home, that nothing but the most painstaking care will prevent it. The child itself—its hands, clothing, etc., are also means by which the milk may receive impurities. Hence the necessity for cleanliness both of body and raiment.

Clean Milk.

The profession is coming to realize more and more every day that clean milk is an absolute prerequisite in infant feeding; that more depends upon this than upon any other single element.

In consequence in many cities the bacterial contents of all milk must be stated and none allowed that contains more than a certain standard, varying slightly with the peculiar beliefs of the health department.

Supplementary Feeding.

In those cases in which the supply of mother's milk is not sufficient to meet the demands of the child, the deficiency should be made up by properly modified cow's milk, but under no circumstances should the child be deprived of what the mother has. The little one is much less liable to attacks of indigestion followed by diarrhea when it has the small amount the mother furnishes than when it has not. This part of its nourishment should be reserved for the night hours, to conserve as far as possible the mother's rest and strength, the better to prepare her for the labors on the following day.

Infant Hygiene.

Intimately associated with "infant feeding," so much so as to be a part of it, is "infant hygiene." During the warm weather no mother should put her babe to bed at night without a bath in cool water, not alone as a matter of cleanliness, but to fortify it against the depressing effects of the following day, and thereby disease. If this were religiously carried out, the family physician would be robbed of many a fee and the household of much anxiety. It gives tone and vigor to the muscular and nervous system, quiets restlessness and irritability, producing calm and refreshing sleep, by which the child enters upon the following day much invigorated. The capillaries supplying the mucus membrane of the alimentary canal being in a paretic condition, are given tone, through the influence of the bath upon the vasomotor nerves, lessening and many times preventing the escape of the watery portion of the alimentary canal, increasing the ill effects of pernicious "infant feeding." The room should be well ventilated, and the air as pure as circumstances will permit.

The bed linen should be clean and fresh laundered, thus making it free from all unpleasant odors. The child should be as lightly covered as possible.

During the heated term mothers and nurses should be encouraged to carry the little ones into the parks and open places, that they may get as much pure air as possible. Parks are not used by the general public as much as they should be. They are health giving and life giving. The opening up of playgrounds for children, as has recently been done by the mayor and common council of this city, is worthy of the highest praise. To those who can afford it, a day upon the lake for these little people is of the highest value.

INSTITUTIONS FOR MENTAL DEFECTIVES.*

By Martin W. Barr M.D.,

OF ELWYN, PA.

CHIEF PHYSICIAN PENNSYLVANIA TRAINING SCHOOL FOR FEEBLE MINDED CHILDREN

Asylum protection for idiots dates back to the early eighteenth century, when to the good St.. Vincent de Paul and his *Confrerie de Charite,* those esteemed as little more than human brutes came to be regarded as *"les enfants du Bon Dieu."* The actual training, however, of feeble minds—a training based upon physiologic and psychologic experimentation, and working towards a definite and practical end—is one of the many triumps of the nineteenth century.

The educational experiment of Itard in 1800 with the wild boy of Aveyron, made to substantiate the views of certain thinkers of the day as to the immediate connection between sensations and ideas, failed to verify, because his subject proved not an untutored savage as he had supposed, absolutely undeveloped or biased by previous environment, but an untrainable idiot.

This, however, had been surmised by Bonaterre, Pinel and other scientists watching with interest the experiment, but Dr. Seguin, closely associated with Itard, recognized also the possibilities for the idiot in a physiologic education, which Itard had demonstrated as completely for him, as had Pereire and Valentine Hany for other defectives—the deaf mute and the blind.

Building upon this theory, Seguin, in 1837, opened in Paris a private school avowedly for the training of idiots, in which he met with such success that he was a few years later called to take charge of a school opened for this class of unfortunates at Bicetre. By a singular coincidence, this was the very site of the asylum before alluded to, consecrated by the prayers and labors of St. Vincent de Paul and his confrères in a previous century.

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* Read before the School of Philanthropy, July 25, 1905.

That the efforts of these devoted men were not permitted to fall to the ground is seen in the success of this establishment which still exists in Paris, and furthermore, in an almost simultaneous movement in various countries toward this one aim, as if the world at large was being impelled by a common impulse to an effort to "comfort the feeble-minded;" so that, before the middle of the century, Germany, Switzerland and America, under the leading of Saegert, Howe and Guggenbuhl, had entered upon the training of mental defectives.

Saegert, in 1843, encountering many of these in his school for deaf mutes in Berlin, had soon realized, as had Howe in his institution for the blind in Boston, 1839, the utter impossibility of co-education of two kinds of defect. Successful experiments in separated classes led both men into an extension of work, resulting in separated establishments speedily influencing emulation in both countries.

In Switzerland the sympathies of Guggenbuhl enlisted in the cause of the cretins of the Alps led in 1842 to the establishment of the Asylum of the Abendberg, where methods of training attracted the attention of philanthropists, and interested observers from all lands.

England, inspired by its example, was soon in the field. The Misses White opened a private school in Bath in 1846, and before 1850 Drs. Twining and Conolly, Rev. Andrew Reed and Mr. Gaskell had taken initiative steps, the results of which are to be seen to-day in the noble institutions of Starcross, Knowle, Essex Hall, Earlswood and The Royal Albert, caring for over 1,000 children.

The Metropolitan Schools of Darenth opened later, 1875, provide for 1,000 of the pauper class of London, and various private schools respond to calls from the nobility, and even from royalty itself.

In Germany, Kern, closely following Saegert, in 1847 opened his school at Mockern, the forerunner of many, which show Germany to-day far surpassing her co-pioneers.

France, with the exception of the Asylum of La Force, near Bordeaux, founded by John Bost, 1846, has not builded upon her past. Her system of public instruction makes no provision for mental defectives; there is but little done in private schools, and the chief of these, L'Institut Medico-Pedagogique at Vitrysur-Seine, under the direction of Bourneville, receives boys only.

Switzerland, although with nothing in the present century to compare with her Abendberg of the past, has yet 18 private asylums, some receiving state appropriations, and her chief cities have special classes for defectives with an attendance of some 600 children; but in 1902 she reported 5,485 mental defectives for whom there was no provision.

In America, Dr. Howe at the moment of reorganizing his work in South Boston was fortunate in securing the aid and counsel of Dr. Seguin himself, who, forced into exile by the stress of the revolution in France, brought to our shores the invaluable gift of his experience. South Boston, Columbus, Ohio, Syracuse and the Pennsylvania Training School each in turn received this benefit before he finally settled in New York City, opening the medico-physiologic school, which, removed some years later to Orange, New Jersey, is still continued by his widow. Meanwhile the influence of his work in Paris, of Saegert in Berlin and of Guggenbuhl on the Abendberg, was extending throughout the entire continent of Europe, and Holland, Russia and Denmark early in the fifties, Sweden and Austria in the sixties, Norway in the seventies, and Belgium and Italy in the nineties had fallen into line; and within the same decade Australia and Japan, emulating this example, completed at once the circle of the globe and of the century.

The United States presents at the opening of the twentieth century no less than 31 large institutions for the feeble-minded, of which 27 are state or municipal, three are private corporations deriving state aid, and one (Barre, Mass.) a distinctly private undertaking, while an ever-increasing number of private schools meets a demand from the wealthier classes.

Thus in 21 States, extending from ocean to ocean, provision is made for some 10,000 mental defectives.

Dr. Samuel G. Howe, Dr. Hervey B. Wilbur and James B. Richards are justly regarded as the pioneers of the work in America. It, as we have seen, owes its inception, and also its incorporation into state charities, and the inspiration of Seguin's co-operation, to Dr. Howe of the Perkins Institute for the Blind in Boston. His experimental class removed to South Boston, 1850, but still directed by him in connection with his other work, was there reorganized by Seguin and the school placed in charge of James B. Richards. Later, removed to its present site—Waverly—in the suburbs of Boston, it has maintained its position among the foremost charities of the state; celebrating its fiftieth anniversary by the inauguration of a colony for its trained workers, and embracing a tract of some 1,600 acres, it affords opportunity for aid in self-support, and for permanent separation under happiest conditions for these children of the state, hitherto a hopelessly dependent class.

Barre, the only private institution in the country, which provides for and has reached the hundred mark, was opened in 1848 by Dr. Hervey B. Wilbur. Hardly was it well established before Dr. Wilbur was called to inaugurate the work in New York, and to take charge of the experimental school at Albany, later removed to its present home in Syracuse. Here he tells of Dr. Seguin's coming, rendering invaluable service to him by his counsel and inspiring his assistants with enthusiasm. This school, which numbers some 600 pupils, receives neither untrainables nor epileptics.

The Pennsylvania Training School at Elwyn might justly claim to be a daughter of Bicetre in direct descent, its founder and first superintendent being James B. Richards, above alluded to, a pupil of Seguin, who was also himself for a brief period associated with him in its direction.

Beginning 1852 as a small private school at Germantown, numbering 17 children, it was later removed to its present location; adding farm to park-land and house to house, it stands today the asylum village of Elwyn, where the little one has literally become a thousand, including pupils from the West Indies, Brazil, Australia, England and Japan, and has sent out a colony of trained workers, numbering some 150 children, to help in the building up of a new institution in the western part of the state.

The Ohio institution, near Columbus, coeval with Elwyn, has also reached the thousand mark. It aims, with the gift from the state of a thousand acres, together with suitable buildings, to make this class of her dependents self-supporting, relieving the state of the burden.

Such a proposition, even, indicates for the work a distinct parting of ways; an advance from the early conception of simply redeeming the individual from a condition of perpetual infancy and rendering him happy in childish sports and occupations, and, therefore, less of a burden. Developing on true educational lines, passing from simple to complex, yet holding fast to the idea originally embodied in Seguin's theory and practice that "the working hand makes strong the working brain," the institutions have, from time to time, added to their occupations manual or simply industrial, as the character and grade of their inmates indicated as needful or as best suited to development. For those of low-grade, knitting, netting, weaving, darning, mat-making, or occupations of house, nursery, farm or garden. Those of middle grade are enabled to enter the various trades; many of the aids to bakers, shoemakers, tailors, carpenters and painters are drawn from this class, while the more intelligent—high grade or backward children—become printers, dressmakers, cabinet-makers, stenographers, musicians, and sometimes even teachers or trusted attendants, but always under some supervision.

As may readily be seen, with such a body of trained employees, working under direction, and with a modicum of wage to give a sense of independence and insure happiness and content, an institution unburdened by epileptics and untrainables might become largely, if not altogether, self-supporting, if it could be assured of a permanent force. But here is just the weak point—the difficulty that besets and hinders the work.

The institutions do not suffer for lack of advertising. Each one has doubtless hundreds on its waiting list, and the public mind is already beginning to be educated as to the fallacy of cure. But it does not yet lay hold of the peculiar weakness and irresponsibility of the mental defective, which precludes continuous effort except under direction and in an environment suited to his peculiar needs, rendering the class, therefore, unfit to compete with normal labor; nor can it understand or believe that where one might succeed ninety will go to the wall. Hardly has the child passed the school period and entered upon that apprenticeship for which the school only prepares him, when parents or guardians, fancying that he can earn wage or assist in the house, withdraw him. It has been more than labor lost in every sense, for not only do the individual, the family and the institution not gain, but society does gain an enemy all the more dangerous, since mental defect has been concealed and disguised.

To society he becomes as the ordinary young man—a trifle eccentric—a little below or, perhaps, beyond the ordinary.

But we know him as always imbecillus—needing a staff—and that he will ever be, competent workman, trained musician, artist or artisan though he be; and we know, moreover, that sooner or later, to the third or fourth generation, imbecility will transmit imbecility. This is the great problem checking advance, that faces both society and the institutions, and a growing concensus becomes evident as to the necessity of an appeal for legislative aid and protection.

The instittuion of Michigan presents it thus: "It is urged that a law be passed whereby persons committed to this institution can be held under more specific terms than at present, and so removing the danger of irresponsible relatives taking from it individuals presumed to be fit to go out."

Both New Jersey and Missouri have lately passed laws virtually amounting to permanent detention, and Pennsylvania, in two successive acts, has sanctioned the invoking of surgical aid to prevent the increase of defectives; yet a measure so pregnant with good for society has been twice lost through the ignorance and timidity of two Governors.

Here and there one finds in print allusions which show the gathering force of public opinion. Such as these, for instance:

"We must try to make the thoughtless question their right to bring children into the world under conditions which are detrimental to child-life; or for society to care for, however troublesome or deficient such ill-born children may be." And again:

"If we may not, as did ancient peoples, let nature destroy such failures, we might at least secure her aid in lessening the numbers of such human failures."

A woman's society for political study favors "race suicide" thus: "In lieu of wasting sympathy on people who surround themselves with large numbers of little ones whom they cannot possibly feed, let the parents starve if they insist upon bringing paupers into the world; or better still, let us have anti-pauperism laws that shall restrict such propagation of the human species." That these signs of the times are not the offspring of faddism, fanaticism, nor a mere ebullition of overwrought feeling, but the natural result of experience, is proven by statistics. Not only have the institutions increased in numbers and broadened their work, but they have been forced to multiply their accommodations and increase their equipment to meet the appalling increase of imbecility generated by a highly nervous age in divers forms, of which the backward child and the moral imbecile are the extreme types.

Special classes for backward, and juvenile courts for delinquent children, have now place in all our large cities, and from these a perpetual stream of all sorts and conditions of degenerates press for admission to the institutions.

To the original asylum, therefore, with mere improvement classes, has been added a department training in the manual and industrial arts, and to these, yet further, custodial buildings for those whose liberty must in a measure be curtailed. Epilepsy, and the effort to force into the training schools the hopeless idiot, and the equally untrainable adult, are difficulties ever present, which the withdrawal of trained imbeciles, who might aid in the care of these in asylum, but intensifies. Indeed, the very presence of these asylums for incapables within the training schools creates a misapprehension in the minds of the public as to the true nature and possibilities of training. A case once entered, nothing can convince the friends that it cannot improve. He is in a training school—why is he not trained (?) is the very natural query. Only when the asylums are removed from the immediate precincts of the training school, although retained under its administration, may these complainants be brought to understand that he who enters these leaves hope behind.

Some institutions refuse to receive either idiots or epileptics; others, such as Rome, N. Y., and the Craig Colony, and Bielefield, Germany, have been organized for their special benefit, and do in a measure relieve the pressure upon others. Some of the German institutions, notably Mariaberg, Alsterdorfer and St. Nicolas Stift, have broadened out on the colony plan with asylums for epileptics and incapables, training schools for abnormal, and orphanages for normal children, distinctly separated.

In this brief review I have tried to make clear that while the work of institutions approaches a climax in both theory and practice, it is being seriously hampered by pressure from without and by complications within. When we consider that the institutions for defectives are doing their best to respond to the demands of society and of the state, it is but just that they should receive that protection which will insure stability and progress which legalized asexualization and segregation alone can give.

RHEUMATISM OF CHILDHOOD.*

By W. C. Hastings, M.D.

Socrates once said, "Could I climb to the highest place in Athens, I would lift my voice and proclaim: Fellow citizens, why do ye turn and scrape every stone to gather wealth, and take so little care of your children, to whom one day you must relinquish it all?"

There is no department in medicine more significant, none commanding more honest work and study, none where progress is more constant and where the beneficence of appropriate treatment is more appreciated by the world than the department that relates to the diseases of infancy and childhood. Accordingly, while I shall not offer anything very new or propound any original theories in this short paper yet I do desire to call attention to a disorder that is too often overlooked in our daily work with children.

We are too prone in making our examinations of children to base our ideas of rheumatism upon the well known symptoms in the adult, namely: severe pain, great swelling, high fever, scanty urine, etc., forgetting that a child with rheumatism may and generally does present a different array of symptoms; in fact, but few of the well recognized symptoms accorded to rheumatism may be present, so that unless great care be exercised, we may not be aware of the real trouble until brought face to face with a serious valvular lesion.

While recognizing the fact that inflammatory rheumatism is perhaps an infectious disease, yet, nevertheless, there often lie in that great realm of metabolism many faulty conditions, making themselves manifest in rheumatic, lithemic and gouty symptoms. If metabolism were better understood a host of troubles might be the better interpreted, for example, rickets, marasmus, and many other conditions. However, it affords a convenient stopping place in our pursuit, until the etiology of the above conditions is better understood.

Well marked cases of rheumatism are very rare before the fifth year. However, I have seen a case in an infant only a few months old. Acute articular rheumatism is quite rare in children, but the other manifestations are very common and as frequently are overlooked or at least are too often passed by. Among these manifestations are growing pains, eczema, erythema, purpura, chorea, migraine, torticollis, gastralgia, anemia, tonsillitis and heart affections.

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*Courtesy of Editor, Northwest Magazine. 1905.

When we have a case of acute articular rheumatism in a child, the swelling may be extremely slight, attended with but little redness and pain, and the fever may be very moderate. In very truth the little one may seem scarcely sick enough to go to bed, the place it should be until all symptoms have entirely disappeared. If this be the case with articular rheumatism, how shall we recognize rheumatism that might well be called the abarticular? Given an hereditary predisposition, attacks of tonsillitis, growing pains, susceptibility to fatigue, anemia, functional nervous disorders, namely: sleeplessness, irritability, erythema,—and you have a case of rheumatism.

Malassimilation, growing pains and tonsillitis are very reliable sign-posts. However, you may not have all these indications; there may be only a history of tonsillitis, with a very tedious recovery. Here we must not fail to examine the heart, or a dangerous endocarditis may be in full bloom before we are aware of it. Moreover, as Dr. Butler says, in The Diagnostics of Internal Medicine, "Pericarditis, fibrinous, serofibrinous or purulent, sometimes attended with delirium, may occur; so also may myocarditis."

One attack predisposes to other attacks, consequently these children need the very best hygienic care, for repeated invasions of rheumatism will assuredly produce heart lesions of greater or less severity. Always look upon "growing pains" and tonsillitis with suspicion. I have noticed in some cases that the removal of the tonsils has been followed by a complete and entire cessation of the rheumatic symptoms. However, we may have rheumatism in children without tonsillar involvement and, moreover, the rheumatism may not manifest itself in any way except by an endocarditis.

Likewise some skin diseases, erythema, eczema, etc., are of undoubted rheumatic origin. Night terrors and sleeplessness are sometimes offshoots also, as well as migraine and gastralgia.

There is one condition upon which I wish to lay particular stress, and that is chorea. The majority of cases are but the manifestations of rheumatism. Uniformly you have the growing pains, tonsillitis and anemia. The danger in chorea is the often accompanying endocarditis.

There is a difference of opinion as to the percentage of chorea cases that are rheumatic, but undoubtedly the great majority are engrafted upon that diathesis. The treatment is largely hygienic, avoiding as far as possible all conditions that have a tendency to aggravate and cause rheumatism. In regard to diet, the consensus of opinion is that "rheumatic children do much better upon a diet composed largely of nitrogenous food and that the sugars and starches should be restricted in amount. Milk should be freely given in all cases" (Holt).

The remedies given should meet the particular condition in which the rheumatism manifests itself. Those usually indicated are the same as in adult life. Thus we have for the more acute cases sodium salicylate, oil of wintergreen, salicin and salol. Alkalies are indicated particularly in those cases where there is a hyperacidity of the urine.

But subacute cases are often little or not at all influenced by the salicylates and the alkalies, and here we have to depend on the use of general tonics, as iron and cod liver oil.

In order to protect the heart during a rheumatic attack absolute rest and an equable temperature for the patient must be insisted on and procured.

For the chorea of rheumatic origin we have the salicylates and cimifuga racemosa, of which give the fluid extract, ten to fifteen drops in water, three times daily. In the non-rheumatic cases of chorea we have arsenic—Fowler's solution—the most valuable remedy we possess.

But let us remember that always, when a child has growing pains, tonsillitis, anemia and functional nervous disorders, we have a case of rheumatism and that its heart is in danger.

OBSERVATIONS ON THE USE OF FORMIC ALDEHYDE AS A MILK-PRESERVATIVE

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The use of small quantities of suitable preservatives for milk, especially during summer weather and in large cities, is by no means universally condemned by sanitarians. At the Sanitary Congress held in Bradford in July, 1903, Dr. Moore, of Huddersfield, in a paper on "The Application of the Food and Drugs Act," said that great advantage would result if a tribunal, having an improved means of estimating the value of scientific evidence, could be provided. Real advantage to the public would result if independent and specially qualified assessors were appointed to assist magistrates, just as nautical assessors were appointed in maritime matters. There would be fewer instances then of magisterial "eccentricities." Under certain circumstances, foodstuffs might with advantage be mixed with preservatives. By this means, articles of a perishable nature could be preserved and an abundant supply maintained, with the result of keeping the cost low. Under existing circumstances this was not what happened. On the contrary, the dealer used preservatives to conceal the staleness of his goods, and sold them as of, and at the price of, the best quality (Report of Proceedings). In the end, after discussion, the conference was unanimous in passing a resolution to the effect that whenever preservatives are added to food, their presence, nature, and maximum amount should be indicated on a label or otherwise declared. With this every fair-minded person will agree. In a recent publication Dr. Aitchison Robertson touches on this point, towards the end of his interesting paper on "Considerations relating to Milk-Supply," and points out that if the legislature would allow small but adequate quantities of certain antiseptics to be added to perishable articles of food, no harm would result to any one, but good rather would accrue. Under the present conditions of our milk-supply in towns, he considers it only proper that small (but known) quantities of preservatives should be added to milk during the warmer months of the year, and believes that thereby the onset of diarrheal diseases might be prevented. It is, of course, retorted that since, for a supply of good fresh milk in town, great care and cleanliness are needed, the employment of anything that would tend to lessen such care and cleanliness would be most pernicious. It must, however, be borne in mind that it is recommended that all "preserved" milks would need to be declared as such, and, since many people would still request pure, fresh, untreated milk, as great care as ever would be requisite to meet this demand. Besides, after all, the legalizing or not of milk preservatives does not really affect the question of a pure milk-supply as far as the rest of the matter is concerned, which is, that whether or not such preservatives are used, sanitary authorities should enforce existing laws and orders relating to cowsheds, dairies, etc., with the utmost stringency, and should do all in their power to lessen the deplorable conditions which at present only too commonly prevail. When that is done, and a sanitary conscience has been awakened in our milk-purveyors and milk-vendors, the use of preservatives will happily become unnecessary.

If any preservative is to be used, it must be one that will keep milk sweet when added in but very small traces, which will not be recognized by taste, and which will have no harmful effect either upon the digestive functions or upon the tissues of the alimentary canal, the kidneys, or other organs. When the power which formic aldehyde possesses of retarding putrefaction became known, it was naturally considered as admirably suited for use in preserving milk, and Allen, in his "Commercial Organic Chemistry" (vol. iv.), stated as his opinion that it was one of the least objectionable that could be used. Its use, however, has been severely animadverted upon, and in many places has been entirely forbidden. In the Report of the Departmental Committee appointed to consider the question of the addition of preservatives and coloring matters to foods and published at the end of 1901, the opinion was stated that formic aldehyde should be entirely prohibited, this opinion being based, in part at least, on experiments that were practically worthless, since the weakest formalized milk used in the experiments contained (as a rule) ten times as much formic aldehyde as a formalized milk in commerce would. Dr. W. D. Halliburton published experiments of this kind in the *British Medical Journal* for 1900 (vol. ii. p. 1), in which he tested the effect of formalized milk on gastric, salivary, and pancreatic digestion, and on the curdling of milk by rennin, before giving evidence before the committee already referred to, and in the experiments he rarely used a milk with less formic aldehyde than 1 in 2,000 (0.05 per cent), which is at least ten times as much as would be used in trade. He speaks of the inhibitory effect of formic aldehyde on rennin in what he considers evidently a very weak solution, viz., a few drops of a 0.2 per cent. solution in one ounce of milk. But in this case the dilution would be less than 1-5,000, and such strength would never be used for ordinary milk-preservation, where 1-20,000 and much less is quite efficacious. It seems to me that tests of this kind tell unfairly against a substance which has a great deal to recommend it, and it is a case of "give a dog a bad name," for formalin in milk generally is looked upon with great disfavor. During the past few years I have made a large number of observations on the preserving power of formic aldehyde on milk, its mode of detection and estimation, and its effects on the digestive processes, and am satisfied that the dangers of that substance have been considerably exaggerated where it is used in a very high dilution. In the carrying out of these observations, especially between 1903 and 1904, I was materially aided by a grant for Scientific Research given by the Carnegie Trustees.

1. The Prevalence of Milk-Preservatives in Glasgow.

Large quantities of milk come into Glasgow every morning from the adjacent counties, particularly from the upper parts of Lanarkshire, Renfrewshire, and Dumbartonshire. A good deal comes from Stirling; Ayrshire and Lower Lanarkshire are sources largely drawn upon, and both Wigtownshire and Dumfriesshire are laid under contribution. As far as my experience goes, the quality of the milk is good, and the use of preservatives is moderate. In 207 samples which I have analyzed, the following results were obtained:—

In 84 analyses for formic aldehyde, all were negative.

In 71 analyses for boric acid and borax, positive result was obtained on 15 occasions.

In 52 analyses for salicylic acid, all were negative.

Of the cases in which boric acid or borax was found (15 out of 71), we have a percentage of 21.1; in 6 of these cases traces only were found, leaving 12.6 per cent. where the amount was distinct. The dairies from which the borated samples were obtained were by no means all in very poor localities; indeed, the majority of these were in the western part of the city, supplying, in many cases, good residential neighborhoods. The samples were not all taken in summer, but the majority of instances where the preservative was found occurred during the warmer months of the year (April to September).

2. The Chemical Reactions of Formic Aldehyde and the Best Means for Its Detection in Milk.

Formic aldehyde (H.COH) being a gas, is not used in that form, but in the saturated watery solution so well known by the name of formalin or formol. This contains 40 per cent. of the gaseous aldehyde when of full strength, is a clear, transparent fluid, of a hot and disagreeable taste, and gives off a vapor that is very irritating to the nasal mucosa and the conjunctiva. Where it is added to milk in any large amount, the taste is readily perceived. Formalin solution is acid owing to the presence of traces of formic acid ($H.CO^2H$); its density is 1,070. A good sample should not contain more than 0.1 per cent. of formic acid, nor more than traces of chlorides, sulphates, or heavy metals. A solution of formic aldehyde readily reduces Fehling's solution, and deposits metallic silver from a solution of the ammonio-nitrate.

The following are the tests for formic aldehyde in milk which I have most frequently employed:—

1. Hehner's Sulphuric Acid Test.—This depends on the fact that formic aldehyde, milk, and sulphuric acid (containing a trace of ferric chloride as an oxidizing agent) yield a violet coloration. Richmond and Boseley recommend that

the milk be diluted first with an equal volume of water, and that 90-94 per cent. sulphuric acid be used. I have usually performed the test by placing in a test-tube 5 c.c. of 94 per cent. sulphuric acid, and allowing the diluted milk to fall upon it by a pipette from an inch above the acid, so as to cause a little mixing. The fluids, however, form a fairly sharp interface, and if formic aldehyde is present a violet ring is observed where the liquids join. In normal milk the ring is greenish. The violet color remains for several days. It should be noted that milk must be present for this test to succeed, the existence of casein being essential. If therefore, the test is applied to wine or vinegar, a drop or two of milk must be added. Further, the sulphuric acid should be "commercial," that is, should contain traces of iron salts. The test is employed by the State Board of Health of Massachusetts, hydrochloric added, and the mixture boiled, with stirring.

As regards delicacy, this test is most suitable for milks containing a little of the preservative; indeed it fails if more than 0.5 per cent. (1-200) be present. Trying it with milks containing varying amounts of formic aldehyde, I obtained the following:—

DILUTION	REACTION
1- 2,000	Very distinct
1- 10,000	Very distinct
1- 20,000	Distinct
1- 40,000	Distinct
1-100,000	Visible
1-200,000	Negative

The test is, therefore, one of considerable delicacy, and the violet ring remains visible for several days.

2. Hehner's Phenol-Sulphuric Reaction.—This reaction is delicate, and can be obtained with any strength of the preservative. It can be done with the milk direct, but it is better to use the distillate. To this a drop of aqueous solution of phenol (1 in 20) is added, and the fluid is poured on to strong sulphuric acid, when, if the reaction is positive, a red or crimson ring forms at the interface. If the amount of formic aldehyde be at all great, a milky turbidity appears above the red zone. I have found this respond well with milk containing

only 1 in 50,000 of formic aldehyde. On distilling 100 c.c.m. of such milk and testing the first 5 c.cm. of the distillate, a very clear reaction was obtained. Still more dilute solutions than this will respond.

3. Jorissen's Phloroglucin Test.—This I have frequently employed, and find it is an excellent test, very simple and easily performed. The reagent employed is phloroglucin (trihydroxy-benzol, $C_6H_3(OH)_3 1:3:5$), which may be suitably employed in a 1 per cent. solution in water. To 10 c.cm. of the suspected sample add 1 c.cm. of the phloroglucin solution and 2 c.cm. of 10 per cent. solution of potassium hydrate, when, in a positive test, a pink-red, light pink, or pale brown color will develop according to the amount of formic aldehyde present. The color appears rapidly; for example, in a solution of formic aldehyde in milk of the strength of 1-10,000, a pink tint will show in 30 seconds, attaining its maximum in 60 seconds. In all strengths the solutions tested assume a very pale lemon or sulphur color on standing. In non-formalized milk no color at all appears; the milk simply looks a little more transparent. I consider this test a very satisfactory one, but ethylic alcohol responds to it.

4. Tatham Thomson's Silver Nitrate Test.—Mention has already been made of the reducing power of formic aldehyde; this is taken advantage of in Thomson's test, where the distillate from suspected milk is treated with a few drops of 2 per cent. solution of ammoniacal silver nitrate and kept in the dark. If the reaction is positive, in twelve hours a dark discoloration of the fluid, due to the separation of metallic silver, will be apparent; a light brown may be disregarded. Other aldehydes may lead to a darkening of the milk, but they certainly do not seem to respond nearly as readily as formic aldehyde does, nor when present in very small quantities. As already stated, the distillate from the milk is used, 100 c.cm. of milk being distilled till from 20-30 c.cm. have come over. As a rule, nearly all the formic aldehyde originally present is found in that distillate. As far as my personal experience goes, I have been led to prefer Hehner's or Jorissen's reaction to that of Thomson; in the former the diagnostic reaction is usually unequivocal, while in the latter there is often a slight brown tint. Further, the test requires twenty-four hours for its completion,

whereas the two first mentioned can be carried out in a couple of minutes.

5. *The Resorcinol Test.*—Resorcinol (di-hydroxy-benzol $C_6H_4(OH)_2 1:3$) is a brown, curry-like powder, smelling somewhat of iodoform. It is soluble in water, alcohol, or ether. It is employed, like phloroglucin (tri-hydroxy-benzol), as a test for formic aldehyde, as it, like the former, develops a red color with formic aldehyde in the presence of an alkali. To perform the test, take 10 c.cm. of the suspected milk, add an equal volume of 5 per cent. caustic potash, and 0.5 grm. of resorcinol. On shaking, a light brown turbid fluid results, whether the milk be pure or not; but on boiling, a normal milk becomes a deeper brown, while formalized milk yields a distinct reddish color. I have not found the test very delicate, and it certainly cannot compare with the phloroglucin reaction.

6. *The Magenta Test.*—Schiff has suggested the use of a reagent which consists of a solution of magenta decolorized by sulphurous acid; an excess of the latter must be avoided. The sample of milk is curdled by dilute sulphuric acid, filtered, and the filtrate treated with a few drops of the reagent, when formic acid aldehyde produces a purple-red color. The reagent is readily made by taking a dilute solution of fuchsin (the ordinary Ziehl-Nielsen stain much diluted does quite well), and carefully adding sulphurous acid till the fluid is colorless. Hehner recommends that 100 c.cm. of the sample should be distilled and the first 25 c.cm. of the distillate placed in a stoppered cylinder along with five drops of the reagent. The color is observed next day, and any due to oxidation is removed by adding a little more sulphurous acid. What persists is due to formic aldehyde, and is usually of a light purple or violet tone.

The test is fairly sensitive. I find that with 5 c.cm. of aqueous solution of formic aldehyde (1-5,000), a delicate lilac color appears in two minutes and becomes a distinct violet in four. With 5 c.cm. of a solution of a 1-10,000, it takes four to five minutes to develop a pale violet tint. These colors are permanent, and do not go on the addition of sulphurous acid. Ordinary aldehyde (CH_3COH) responds to this test, but acetone does not.

7. *The Ortho-methyl-amino-phenyl-sulphate Reaction.*—In

the British Medical Journal of March 21, 1903, Saul described a reaction with the above-named chemical and peroxide of hydrogen, by which it was possible to distinguish raw milk from boiled, the former yielding a fine deep pink tint, and the latter showing no change of color. This change he suggested might be due to the action of a ferment in milk destroyed by boiling. In a paper which I published in the Lancet (July, 1903, p. 24), I further studied this phenomenon, to which I gave the name of the ortol reaction, since the chemical mentioned by Saul is most easily obtained in the photographic reagent ortol. A 1 per cent. solution of this does for the test, along with one drop of weak peroxide of hydrogen solution. This reagent without the addition of hydrogen peroxide will yield a pink color with formalized milk on standing. This is not a specific reaction for formic aldehyde, but is simply an accelerated production of the color which normally appears in any case, in course of time, in a milk free from the aldehyde. The color produced in formalized milk is quite distinct and persists for hours. The reaction was tried with normal, formalized milk, milk containing ordinary aldehyde, and milk with acetone, and in half an hour there was a distinct pink in the milk with acetone (most marked) and with formic aldehyde, and in normal milk, while that containing acetic aldehyde showed but a slight change. This reaction, though interesting, is therefore not peculiar to formic aldehyde, but is shared generally by the aldehydes and ketones.

There are other tests proposed for the detection of formic aldehyde, as, for example, the di-amino-phenol-hydrochloride reaction suggestion by Mauget and Marion, with which I have no acquaintance, but of the seven detailed above, Hehner's with sulphuric acid, and Jorissen's phloroglucin reaction will be found very useful. Taking a milk and adding full strength formalin till the proportion of formic aldehyde was 1 in 50,000, it was found:—

(a) That 5 c.c. reacted promptly to the phloroglucin test, showing a pink tint in fifteen seconds.

(b) That with Hehner's sulphuric acid test, a distinct violet ring was obtained, a control of pure milk yielding a green zone.

(c) That with Hehner's sulphuric-phenol test a rose ring was obtained, the color in the control being yellowish-brown.

(d) That Thomson's silver nitrate test gave a doubtful reaction.

Such a milk reacted as follows with strong mineral acids:—

(a) With an equal volume of ordinary strong hydrochloric acid it gave a fine pink tint in the cold, changing on heating to a beautiful purple; a control gave no pink tint, and on heating simply grew dark brown.

(b) Strong nitric acid (equal volume) produced, alike in the formalized milk and in the control in the cold, a bright yellow coloration.

(c) Strong sulphuric acid (94 per cent.) added in equal volume produces quickly a deep purple in the cold, while a control yields a greenish-yellow tint, rapidly changing to a coffee-brown, and eventually to black.

Even with a milk containing 1 in 90,000 of formic aldehyde a distinct violet ring is obtained with Hehner's sulphuric acid test; the phloroglucin reaction shows a very pale pink in five seconds, attaining a maximum in thirty seconds; strong sulphuric acid gives a distinct general purple in the cold, and strong hydrochloric acid causes no change of color in the cold, whereas, on boiling, a delicate lilac-pink hue becomes apparent. It is thus clear that in practice, very small amounts of formic aldehyde in milk can be detected.

Before leaving the purely chemical part of this subject, I desire to touch briefly on two matters not yet considered, viz., the determination of the acidity of formic aldehyde, and the quantitative estimation of the actual amount of the aldehyde ($H.COH$) in any sample.

The Acidity of Formic Aldehyde.—As already mentioned, a good solution of formic aldehyde (formalin) should not contain more than 0.1 per cent. of formic acid ($H.CO_2H$). The acid is very irritating, and it is therefore desirable that it should be reduced to a minimum amount. It is readily estimated by the use of deci-normal caustic potash, with phenolphthalein as an indicator, precisely in the same way as the total acidity of gastric washings is computed. In actual practice, 10 c.m. of the formalin are titrated with the alkali, till neutralization is obtained, and the number of cubic centimeters of caustic potash solution employed multiplied by 0.0046 (derived from 46—the molecular weight of formic acid), gives the amount of acid present in the quantity of sample taken. For example, in testing one of the samples of formalin (of full strength) which I used in experimenting, it was found that 10 c.cm. required 1.5 c.cm. of $\frac{N}{10}$ KOH for neutralization.

Then $1.5 \times 0.0046 = 0.0073$ grms. formic acid in 10 c.cm. formalin=0.073 per cent., which is below the maximum 0.1 per cent.

The Determination of the Amount of Formic Aldehyde in any given Sample of Formalin.—Specimens of formalin on the market do not always contain the full amount of 40 per cent. formic aldehyde, and it is necessary, therefore, before using any such specimens for purposes of experiment, to determine exactly how much of the aldehyde is present. The method I usually employ is that described by Schiff (Zeits. Pharmak., 1903, 109), in which the formic aldehyde, neutral ammonium chloride, and normal solution of caustic potash, are allowed to react together, the former two producing hexamethylentetramin, $N(CH_2)_6$, and liberating hydrochloric acid, which is neutralized by the caustic potash, thus:—

$$6H.COH + 4NH_4Cl + 4KOH = N_4(CH_2)_6 + 4KCl + 10H_2O.$$

The more formic aldehyde present, the more caustic potash is required to produce final neutralization. In actual practice, 10 c.cm. of the sample are taken, made up to 200 c.cm. with water, and neutralized if acid. The fluid is filtered, and to 10 c.cm. of the filtrate there are added 3 to 4 c.cm. of water in which 0.5 grm. of neutral ammonium chloride has been dissolved. Normal caustic potash is then run in cautiously from a burette till the fluid is just alkaline, litmus being used as the indicator. Each cubic centimeter of potash solution used, multiplied by the factor 0.045, gives the amount of formic aldehyde in the quantity of sample taken. Thus in one sample tested, I diluted 5 c.cm. to 200 with water, and used 10 c.cm. (equal to 0.25 c.cm. of undiluted sample) for the estimation. To this were added 3.7 c.cm. of water containing 0.5 grms. pure ammonium chloride, and it was found that 1.8 c.cm. of normal potash were required to effect neutralization.

Then $1.8 \times 0.045 = 0.081$ grms. formic aldehyde in 0.25 c.cm. of undiluted sample, and accordingly $\frac{100 \times 0.081}{.25} = 32.4$ is the percentage.

Another method of doing this estimation, and based on the same chemical reaction, had been described before this by Carl E. Smith in an exhaustive paper published in the American Journal of Pharmacy, 1898. He recommended that 2.25 grms. of the sample, 2 grms. of ammonium chloride (dissolved in 25 c.cm. water), and 25 c.cm. of normal caustic potash should be mixed in a stoppered flask and left for several hours. At the end of that time the amount of potash left was determined by titration with normal sulphuric acid, and the difference gave the amount that had entered into the chemical reaction already described. Working with 2.25 grms. of sample, every 1 c.cm. of potash consumed is equal to 2 per cent. of formic aldehyde, so that if a sample of formalin is full strength, it would lead to the using up of 20 c.cm. of the potash.

3. THE PRESERVING POWER OF FORMIC ALDEHYDE

A large number of observations were made on the preserving power of this aldehyde when added to milk. It must not be imagined that it has the power of rendering milk sterile when added in small quantities, or of preventing the development and action of various micro-organisms. Like other milk-preservatives, it simply prevents the souring of milk, and greatly inhibits the activity of the bacillus acidi lactici. But this souring is the earliest occurrence in warm weather which makes milk unsuitable for human food and leads to its rejection, and it is a serious question, as already stated, whether the use of small quantities of preservatives should not be allowed (their presence and amount always being declared), just to keep milk sweet in warm weather for, say, 20-24 hours after milking. It may be replied to this that this addition will not affect the great majority of organisms in the milk, but will merely mask their presence; but it must be remembered that if the milk kept sweet without any preservative for 20 hours, we would have just as many organisms present (perhaps more), and this milk would be, and is, largely consumed by all classes of the community. The diminution of the total organisms in milk is not to be accomplished by the addition of any preservative, but by attention to rules of daily-hygiene, such as those suggested by Dr. Aitchison Robertson in a recently published paper. The proportions of formic aldehyde in the samples used for testing the preserving power were as follows:—

1- 5,000
1-10,000
1-20,000
1-25,000
1-30,000
1-40,000
1- 50,000
1- 60,000
1- 70,000
1- 90,000
1-100,000

(1) Strength, 1-5,000.—The control milk set up at the same time as the formalized, and kept under the same conditions, was sour in 24 hours, while that with the aldehyde remained sweet still after 72 hours; by 96 hours it had a peculiar, disagreeable taste, and next day it was putrefying. In this strength the preservative is at once perceptible to taste, producing a peculiar, hot sensation in the pharynx; it would, of course, never be used in so large a quantity as a milk-preservative. In this proportion the latter is a powerful retarder of bacterial activity. I took, for example, some of the formalized milk of 48 hours' standing, which was still sweet, and inoculated it with some sour milk from the control. The inoculated milk never gave evidence of any action of the bacillus acidi lactici, but was quite sweet after the lapse of another 24 hours, and after 48 was not yet sour, although it had a peculiar taste. Next day it was decomposing.

(2) Strength, 1-10,000.—Milk of this character kept at room temperature always remained sweet at least 48 hours, whereas the control was practically always sour within this time. On two occasions the milk remained sweet for 72 hours, and once even as long as 79, but after that time altered in character, sometimes becoming sour, sometimes altered and peculiar in taste, going on to decomposition. Milk with 1-10,000 formic aldehyde has a taste of the latter that is perceptible.

(3) Strength, 1-20,000.—In general, milk with this amount of formic aldehyde kept sweet for 48 hours, though on one occasion the milk was curdled by this time and sour. Forty-eight hours of freedom from souring may be taken as the average, but on one occasion (July, 1904), at room temperature, such a milk

kept right for almost 80 hours, the control milk having soured 27 hours earlier. The aldehyde is barely perceptible in this dilution, by the palate.

(4) Strength, 1-25,000.—Only one observation was made at this dilution. The milk taken was probably 7 hours old (from milking), and a control, along with the formalized milk, was put up at room temperature in January. The control remained sweet for 24 hours, but by 48 hours had soured. The milk with the formic aldehyde was sweet even after the lapse of 72 hours.

(5) Strength, 1-30,000.—When a dilution of this degree was employed, it was found that whereas in a room in July the control kept sweet for 48 hours, the sample with the preservative remained free from souring for as long as 72 hours. By 76 hours, however, it was found to be just turning. This amount of formic aldehyde stated in weight as grains per gallon of a milk of specific gravity 1032, is about 2.40 grains of aldehyde per gallon.

(6) Strength, 1-40,000.—When milk was examined with formic aldehyde present in this amount, it was found that it remained sweet and natural for 24, but not for 48 hours, the control milk being curdled slightly at 24 hours, and markedly so at 48. The formalized milk was just turning at 48 hours, and had a peculiar taste. The preserving power was obvious, though not very lasting. Such milk would contain about 1.8 grains of formic aldehyde per gallon.

(7) Strength 1-50,000.—When this small proportion of the preservative was added, the milk did not always remain sweet longer than the control. It did sometimes, however, on one occasion being all right 48 hours after being set up, while the control was sour by this time. Five hours later the formalised milk was "turning," and by 72 hours was quite sour. There was no taste of any preservative perceptible.

(8) Strength 1-60,000.—Only one sample was tried of this dilution. Put up along with the control at noon, in April, at room temperature, when the milk was perhaps 7 hours old, it was found to be natural and sweet, but weakly acid, 24 hours later; at this time the control was slightly curdled, but not distinctly sour, with an altered taste, and very acid in reaction. Next day both were very sour, much curdled, and very acid.

(9) Strengths, 1-70,000, 1-90,000, and 1-100,000.—Milks were tested containing formic aldehyde in these very small pro-

portions, which, it was found, were inefficient to preserve. In the proportion of 1-70,000 it was observed that there was a little less souring at a certain time than was observed in the control, but the difference was slight, and in neither case could the sample possibly be regarded as "sweet." In strengths of 1-90,000 and 1-100,000 no difference could be detected between the formalised and control milk.

Two facts emerge from a consideration of these tests on preserving power. The first is, that with a rather large amount of formic aldehyde present, no souring occurs, the milk keeping sweet at first, and later on rather undergoing a putrefactive change. With strengths of 1-5000 and 1-10,000, the activity of the bacillus acidi lactici is thus markedly inhibited, and, as noted already, the addition of actually soured milk to fresh milk containing 1-5,000 of the aldehyde leads to no extension of the souring. When we deal with milks of the strength of 1-20,000 and dilutions beyond this, we see that the milk, when it does begin to change, undergoes ordinary souring like the control. The action of the bacillus of lactic acid is thus merely delayed, not prevented. This is an important matter, because it has been said (and the statement would carry great weight if it were true) that the use of such a preservative would be really harmful, inasmuch as it would mask the changes taking place in milk through the activity of organisms of putrefaction, and that as the danger signal of "souring" would be wanting, such a milk might be consumed and do much harm. As, however, with dilutions beyond 1-20,000 (and such dilutions would always be employed in the dairy industry), souring occurs as a practically invariable rule, this argument loses its weight; the milk is simply kept sweet for a slightly longer period than it otherwise would, and becomes "turned" in due course like any ordinary specimen. It ceases to be consumed, therefore, long before any putrefactive changes have set in.

The other point on which comment must be made is, that in order to keep a milk sweet for, at any rate, 30 hours from time of milking, it is not necessary to employ formic aldehyde in a greater proportion than 1 in 40,000 (.0025 per cent.). With a strength of 1 in 30,000, milk could be kept sweet for from 48 to 72 hours, and with 1-40,000 from 24 to 48 hours. When we come to 1-50,000 we find the effect of the preservative sometimes very dubious, and with weaker mixtures no reliable preservation can be attained. In the case of a strength of 1-40,000 there would be about one-quarter of a grain of formic aldehyde in an imperial pint, or say one-eighth of a grain in a tumblerful of milk. A milk containing 1 in 30,000 will be preserved still better, but certainly if this preservative should ever be legalized, it would not be necessary to use larger quantities than this. We may accordingly conclude that we are dealing here with one of the most efficacious preservatives known.

4. THE EFFECT OF FORMIC ALDEHYDE ON THE DIGESTIVE FERMENTS.

Much has been written and spoken on the harmful influence exerted by this preservative on the digestion of foodstuffs to which it has been added. Some of the opinions held regarding this matter are, I believe, susceptible of revision, for there is little doubt that in many of the experiments on which these opinions were based, far too strong solutions of aldehyde were employed. Tests have often been carried out with solutions of 1 in 2,000 (0.05 per cent.), whereas no solution containing more than 1 in 20,000 (0.005 per cent.) should be considered.

A. Action of Formic Aldehyde on the Action of Rennin.—It was found, on taking 40 c.cm. of a pure, fresh milk in a beaker at a temperature of 37° C., that the addition of one drop of a good essence of rennet induced curdling in 20 seconds, the curdling being quite complete in 40 seconds. Only once was it noted that it took as long as 25 seconds for the curd to begin to form, and complete curdling was never delayed beyond 40 seconds, the curd being then firm and good. The same milk, containing formic aldehyde to the extent of 1 in 10,000, or 0.01 per cent., gave clear evidence of the onset of curdling, after the lapse of 20 seconds, and the action was complete in 40 seconds, a firm and satisfactory curd being produced. There was thus no difference in the effect of rennin on such milk as compared with pure milk; it was only when much stronger mixtures were used that any retardation in the curdling took place, and the curd was softer than usual. As in the preservation of milk for ordinary summer use an addition of the aldehyde to the extent of 1 in 30,000 or 40,000 is sufficient, it is clear that its presence in this minute amount would exercise no retarding effect on rennin action, since even with a 1 in 10,000 milk no delay is perceptible.

B. Effect on the Salivary Digestion of Starch.—To test this, observations were made on the action of fresh saliva on a 1 per cent. solution of well-boiled starch, diluted to a definite amount with pure water for the control, and with solution of 1 in 25,000 formic aldehyde for the test. Using 1 c.cm. of the starch solution with 1 c.cm. of fresh saliva, and 5 c.cm. of either pure water or formalized water, it was noted that all the starch was inverted as rapidly in the one case as the other. For example, in one instance the control showed an absence of starch in 4 minutes, and the formalized solution in barely 4 minutes; in another instance the control gave no evidence of starch in 3¾ minutes, while the solution containing the formic aldehyde yielded exactly the same result. There was no evidence whatever that the activity of ptyalin was affected in the presence of 0.004 per cent. (1-25,000) of formic aldehyde, and no stronger solution would ever need to be used as a preservative.

C. Effect on Peptic Digestion.—Much has been written regarding the pernicious influence of formic aldehyde on gastric digestion, some ascribing it to the effect exerted on the ferments, others to the hardening of the proteid in the ingested food by the aldehyde. I cannot say that I have ever been able to satisfy myself as to this retarding influence, or seen any indication of it except perhaps on one occasion where it was extremely slight and where there was some doubt as to the exactness of the procedure. In this instance an aqueous solution of formic aldehyde was used of the strength of 1 in 20,000 and a control of pure water. Of each of these, 10 c.cm. were placed in test-tubes, with 1 c.cm. of Benger's Liquor Pepticus and ten drops of 10 per cent. hydrochloric acid, and to each tube was added 0.5 grm. of carmine fibrin (such as is used in Grützner's digestion test), pressed free of moisture between layers of filter paper. The tubes were kept in the water bath at 40°, and examined every 5 minutes, each tube being shaken twice in the interval. The rate of digestion was gauged by the depth of color imparted to the fluid by the liberated carmine. It certainly did appear to be slightly more marked in the control than in the formalized solution, but the difference was very small, and there was some doubt as to whether the moisture was equally well removed from the two portions of fibrin—a point which would affect the amount of carmine present. Repeating the test with a solution of 1 in 30,000, each tube containing only 0.25 grm. of carmine fibrin, it was observed that as far as the eye could judge the tints were identical, and no evidence of retarding effect could be detected.

Varying the method, 100 c.cm. of a solution of 1-50,000 formic aldehyde were taken, to which were added 1 c.cm. of liquor pepsinæ and 3 c.cm. of 10 per cent. hydrochloric acid and 1 grm. of carmine fibrin. A control test with 100 c.cm. of pure water was also used. Both were kept at 38° C. with frequent stirring, and the activity of digestion was determined by the time required for complete solution of the fibrin. In 5 minutes a pink color in each beaker indicated that digestion had commenced; in 8 minutes the fibrin was largely gone; in 10 minutes each liquid was equally red, and there was, if anything, rather more fibrin undigested in the control; at the end of 20 minutes the formalized solution was clear of fibrin, and in the control a very few minute flakes were still perceptible. There was thus no evidence of any retarding influence whatever; indeed, it might be said that digestion proceeded more rapidly where the formic aldehyde was present, but the small difference may be disregarded, being due, possibly, as in the first observation, to a slight difference in the weight of the fibrin curd.

The effect on digestion was also observed where the fibrin was first soaked in the formalized solution for some hours, previous to the use of the pepsin and acid. For example, equal weights of carmine fibrin were taken, and one portion was left in solution of formic aldehyde (1-50,000) for 8½ hours, while the control lay in pure water for the same period. Pepsin and acid were then added and the specimens were kept at 38° C. The fibrin was completely digested in each case in 30 minutes, and no difference could be detected between the digestibility of the fibrin subjected to the action of formic aldehyde, and of that not so treated. Experiments were also conducted on similar lines, where Mott's white of egg tubes were employed to test the rapidity of digestion, but the results obtained were not nearly so clear or so good as when carmine was used.

D. Effect of Formic Aldehyde on Pancreatic Digestion.—Various experiments were carried out to determine this point. Of carmine-fibrin, 1 grm. was taken and left to soak in 100 c.cm. formic aldehyde solution of 1-50,000 for 8½ hours, a similar amount being left in pure water (same volume) for an identical period. There was then added to each, in a beaker, 1 c.cm. of strong glycerine extract of pancreas, and 1 grm. of anhydrous sodic carbonate, and the beakers were placed in the water bath at 38° C. A pink color soon appeared, indicating that digestion had commenced, and the beakers were examined after the lapse of 5, 10, and 15 minutes. At the latter time the colors were the same, and digestion appeared to have proceeded equally in both, though the process was much slower than with pepsin. After the lapse of 25 minutes, 40 minutes, 50 minutes, and 65 minutes, the test beaker and the control gave similar results, a fair amount of fibrin, in a swollen and somewhat gelatinous condition, still remaining in each. There was no evidence of any retardation in the digestion of the formalized fibrin.

Repeating this, I obtained the same results; the fibrin was left in 1-50,000 formic aldehyde for 8½ hours, and then treated with pancreatic extract as described above; a control was also put up. Observations made after the lapse of 10, 20, 30, 40, and 100 minutes, gave similar results; after 6 hours and 40 minutes a little was still found undigested in each beaker, and there was, if anything, a little more left undigested in the formalized solution than in the control, indicating a slight retarding influence. By next day digestion was complete, and both were equal in tint. On another occasion the observations were made on carmine fibrin treated for 3¾ hours in the formalised solution, sodic carbonate and pancreatic extract being added thereafter, as before, and the whole kept, along with control, at 38° C. The solutions were observed every 10 minutes for a period of 100 minutes. For the first half hour, the rate of digestion appeared equal in the two solutions, but after this the fibrin in pure water appeared to digest rather more rapidly than that which had been subjected to the aldehyde. The difference was not great, indeed it was very slight, yet it was appreciable. I think this was the only occasion on which retardation of digestion was observed in the formalized solution or material, and since it was not apparent in either of the two trials with fibrin that had been subjected to the influence of formic aldehyde for 8½ hours, it seems susceptible of some other explanation. We may, I think, conclude that there is little to support the view that this preservative retards digestion, when present in such proportions as from 1 in 25,000 to 1 in 50,000.

5. The Effect of Formic Aldehyde on Milk Analysis.

The question might possibly be raised as to whether the presence of formic aldehyde in milk would interfere with the analysis of such milk. Would results be obtained unfavorable to the vendor or the reverse? It is known, for example, that this aldehyde can reduce Fehling's solution. Would its presence tend to make a milk appear richer in lactose than it really was? I made a number of analyses of pure milk, and of the same milk containing 1 in 25,000 formic aldehyde, estimating the proteids by Ritthausen's method, the fat by the Werner-Schmidt tube, and the lactose by Fehling's method (using the filtrate from the Ritthausen process for the titration), and I obtained results sometimes higher for the pure milk, sometimes for the formalized. The variations could all, I think, be covered by the experimental error; after all the points in milk analysis that really matter are the total solids and the fat, and I doubt very greatly whether in 10 grms. of a milk (the amount that might be used for such analysis) containing, let us say, 1-20,000 of formic aldehyde, the actual quantity of 0.0005 grms. that is present could influence either the evaporation of water (for the total solids) or the extraction of the fat by ether (for the fatty solids). I incline to the opinion that such small amounts of the preservative exert no appreciable influence on the analysis of the samples containing them.

6. The Influence of Formic Aldehyde in Milk on Metabolism.

I have not yet had time to consider this matter as fully as I should like, and shall postpone any detailed mention of it for the present. In July 1901, Tunnicliffe and Rosenheim published some observations they had made (Journal of Hygiene), using children as the subjects, and administering formic aldehyde in food in the strength of 1-9,000 (fairly strong). They made observations on proteid and fat metabolism, on water retention, on body growth, etc. The experiments lasted twenty-eight days in each case, the first and last seven days respectively being fore- and after-periods, to allow of metabolic equilibrium being regained, while the preservative was given in the fortnight between. They selected three children, two being healthy boys, and one a delicate girl. They concluded that in healthy children, formic aldehyde in the strength mentioned causes a retention of water in the body, but exercises no appreciable effect on the metabolism of phosphorous or nitrogen, or on fat assimilation; in somewhat large doses it tended to diminish fat and phosphorous assimilation, possibly due to some effect on the pancreatic ferments. In a delicate subject they found that no retention of water in the body resulted, the nitrogen assimilation was little affected, there was an increased excretion of phosphorous, and fat assimilation was somewhat loosened. In all the cases the excretion of lecithin was diminished, no intestinal antiseptic effect could be discovered, and the general health remained constant. These observations indicate that there is really no effect of any importance caused by the use of food containing 1-9,000 of formic aldehyde, or at least three times as much as would be employed for ordinary preservation of milk.

The question of the effect of very small amounts of the preservative on nutrition is one which I do not mean to discuss here, as it requires long-continued observation and experiment, and my own data are as yet too scanty to be of any real value. As far as they go, however, they do not point to any ill-effects from the use of milk containing, let us say, 1 in 30,000 of formic aldehyde. I think it is extremely improbable that when present in this small amount it could exercise any irritating or hurtful influence on the gastric or intestinal mucosa, for its chemical affinity is chiefly, if not entirely, for albuminous material, and the caseinogen of milk will more than satisfy, a feeble union probably taking place between the two, leaving none free to affect any mucous surface over which the food may pass. Observations made to determine whether any formic aldehyde present in milk was excreted by the kidneys, gave either negative or extremely feeble positive results. For example, the bladder being empty and the subject fasting, 145 c.cm. of milk containing 1 in 30,000 of formic aldehyde was ingested at 1:15 A. M. At 1.15 P. M. urine was passed and tested as such for the preservative with negative results. At 3 P. M. the bladder was again emptied. and the sample again gave a negative result. These two samples, amounting to 200 c.cm. of urine, were then mixed and distilled, and 10 c.cm. of clear distillate obtained, which gave a very faint reaction with Jorissen's test. On another occasion, however, 150 c.cm. of milk with 1 in 25,000 of formic aldehyde having been taken, no trace of the latter could be found in the distillate obtained from 150 c.cm. of urine passed about three hours after the milk was swallowed. A normal urine on distillation gave no reaction with Jorissen's test

The conviction that has been forced on my mind by the foregoing observations, and others of similar nature, is that we have judged this preservative somewhat over-severely. I am far from making the suggestion that preserved milk is as good as fresh, but as stated in the beginning of this paper, under existing circumstances, milk comes into town teeming with myriads of organisms, and in warm weather a great deal is lost. To obviate this, preservatives are constantly used in varying and often excessive amounts; would it not be better that the use of certain preservatives should be allowed, provided always that their nature and amount were clearly declared? If this were come to pass, I would urge a plea for reconsideration of the claims of formic aldehyde in such proportions as 1 in 30,000 and 1 in 40,000, believing that it might be possible to remove the ban under which it lies at present.

EDITORIAL

HEADACHE IN CHILDREN.

The frequency and significance of headache in very young children is a subject to which adequate importance is, perhaps, seldom attached by the average practitioner. It is often a symptom of organic and functional disease, sometimes of a serious nature. Acute headache with rising temperature is common as a prodromal symptom of the infectious or toxic diseases, and its character and concomitants are of diagnostic value.

In tuberculous meningitis, for instance, the intensity of the pain is disproportionate to the degree of pyrexia. It is not very intense, but rather constant, and shifting the position of the patient has no effect upon it, but it produces a craving for rest and quiet. An acute headache, accompanied by vomiting, and a slow and irregular pulse is indicative of meningitis.

Chronic headache, on the other hand, may proceed, among other causes, from rapid growth. At least, such is the conclusion reached by Cattaneo (Clin. Mod., September 13, 1905). He notes that it is often observed in rapidly growing boys at the age of nine to eleven years, generally occurring in the morning and in a frontal location. Such headaches cease with the period of rapid growth, but may generally be dissipated by rest and tonics, as they are aggravated by overwork. Vague pains in other parts of the body, especially in the knees, are often complained of at the same time, and the children suffering from them are invariably of the nervous type. Occasionally they are found to have epiphysitis or cardiac hypertrophy.

Physical or mental fatigue, carried to excess, will produce headache in children, and thus it is of common occurrence in school children, either those who are exceptionally quick and ambitious and eager to subject themselves to extra strain, or among those who are slow and "backward" to a degree that makes the accomplishing of ordinary tasks a painful effort.

Defective vision, especially errors of refraction, has long been recognized as a prolific source of headache, as are also naso-pharyngeal obstruction, otitis and carious teeth. Often headaches may be attributed, with other characteristic symptoms, to anemia, which may, in turn, be due to nephritis following some infectious fever, and quite unsuspected.

Auto-intoxication, arising most frequently in the intestinal tract, will also cause headaches in children, and may be traced not only to disease, but quite as frequently to parasites or to simple constipation. In such headaches regulation of the diet and bowels is indicated. More rarely external causes of intoxication can be discovered, in the shape of drugs or lead poisoning or carbonic acid gas.

Periodical attacks of headache, unaccompanied by fever, are observed in malaria. A chill and an enlarged spleen may accompany this headache, which is of a neuralgic character and generally supraorbital in location.

Cattaneo has found hemicrania fairly frequent in young children, and often associated with other rheumatic manifestations. He also discusses in his article the organic cerebral lesions, cerebral tumors and syphilis as related to the svmptoms of headache, and after reading such a contribution to the study of this subject one would not be apt to neglect or minimize in importance any headache occurring in a child.

A NEW TREATMENT FOR TETANUS

Although one Fourth of July is receding into the distant past, and another one only approaching in the equally distant future, an occasional case of tetanus does occur from other causes than toy pistol wounds, and a recent one in New York City has given opportunity to test a treatment which theoretically, and thus far practically, promises good results.

For some time past some very interesting studies have been carried on by Dr. S. J. Meltzer of New York in the investigation of a property which he discovered to be possessed by magnesium salts, the property, namely, of inhibiting the functional activity of nervous tissue. Most of these studies, however, were directed to its utilization as an anesthetic, and it was reserved for Dr. J. Blake, of New York, to apply it as an antispasmodic.

A young boy was cut while engaged in skinning hides, and the wound was dressed in the outpatient department of Roosevelt Hospital. In a few days a typical case of tetanus developed, and refused to yield to tetanus antitoxin, which was twice administered on succeeding days.

The patient showed marked opisthotonus, and could not swallow food, in fact the symptoms were such as are usually observed in cases proving fatal. At this stage Dr. Blake administered by subdural injection one c.c. of a 25 per cent. solution of magnesium sulphate to every 25 pounds of body weight. The results were marked and prompt, the convulsions being controlled and the patient enabled to eat. The dose was repeated every 36 hours until four doses had been given, and subsequently after morphine and chloral had been given for several days, the magnesium sulphate treatment was again necessary. The patient recovered completely.

It is perhaps too early to estimate accurately the value of such treatment, but it certainly promises well, and anything which can give the profession greater confidence in meeting the harvest of tetanus cases which are invariably sown by "the day we celebrate" will certainly be welcomed with considerable enthusiasm and given a thorough trial.

ABSTRACTS

On Hypertrophy of the Pylorus in Infants and Its Medical Treatment (Continued).

Loreta's operation of stretching the pylorus was first performed with success by Dr. J. H. Nicol of Glasgow in 1900. He was soon followed by M. Schmidt, Stiles, Burghard, and Grisson.

Pyloroplasty has been strongly advocated by Cautley and Dent, and very sucecssfully performed in several cases by the latter.

Pylorectomy was once performed unsuccessfully by Stiles. It has been abandoned as too severe an operation, and less suitable than the others above mentioned.

Ibrahim regards gastro-enterostomy as the best operation when the child is not extremely weak. In specially feeble babies he recommends either Loreta's operation or pyloroplasty.

The after-treatment in all these operations is in many cases extremely difficult, as the absorption of nourishment seems sometimes to be greatly interfered with in some way. If, however, the child survives the first few months, he is likely to regain his health completely and the recovery is permanent.

The discovery of any treatment that gave a chance of permanent recovery in such a fatal disease was, of course, an immensely important gain in knowledge, and the brilliance of the surgical success is worthy of the fullest recognition. At the same time, we can scarcely rest satisfied while a disease affecting such frail babies has for its routine treatment a choice of the gravest and most delicate operations in surgery. Our feeling of dissatisfaction is further strengthened by the fact that in the majority of cases even the most successful operation is not followed at once by complete relief. In a number of cases in which the surgeon's part has been done perfectly, the child has yet died from diarrhea or atrophy, in spite of every care. Any improvements in medical treatment are therefore matters of great interest.

Medical Treatment.—Although the medical treatment of hypertrophy of the pylorus has only come into prominence within the last year or less, it is by no means quite a new subject. In 1896, Finkelstein quoted Heubner as having had several cases, probably of this nature, which had recovered without operation; and Heubner now claims to have had no fewer than twenty cases cured by medical treatment only. In 1899, Batten proved by a post-mortem examination in a case of his which had died from other causes, some time after recovery from pyloric symptoms under medical treatment, that recovery in these cases did not necessarily mean that the diagnosis had been wrong. Others have since made similar observations, and there can be no doubt that a considerable number of genuine cases of hypertrophy of the pylorus have recovered without operation.

The treatment must be carried out with the greatest possible care as to details, and the child should be regularly weighed every two days to guage his progress. Our object is to get him to retain sufficient food for purposes of nourishment, and with this end in view we try—

1. *To remove all possible causes of irritation* to the stomach.—This we do mainly by lessening the bulk of the meals, and so changing their character that they shall contain as little solid residue as possible.

2. *To soothe the stomach* by stomach-washing, sometimes by gavage, by the application of hot poultices over the abdomen, and, perhaps, by the administration of sedatives.

3. *To ease the patient* by allaying the thirst of his tissues, which causes him great distress so long as his pylorus will not let through an adequate amount of fluid. We do this by rectal and subcutaneous injections of normal saline solution.

Before referring in detail to the measures to be taken to attain these ends, we may say that the ease with which cases yield to treatment varies enormously in different instances. In some the symptoms are so intractable that *nothing* short of operation will save them. In others, surprisingly simple measures may succeed. Thus Still had one case in which the symptoms came on while the child was being carefully fed on milk and barley water; and they subsided rapidly when peptonized milk and bismuth were given. Ibrahim reports similarly easy successes by washing out the stomach, giving the baby nothing but water for twelve to twenty-four hours, and then carefully regulating the quantity of breast-milk given. Generally, however, a great deal of care and perseverance is called for before improvment sets in. It may, for example, be three or four weeks before the weight begins to increase.

(1) Most writers are agreed that a *diminution of the quantity* of food which the child is taking is one of the first points to be attended to. Dr. Willoughby Gardner began the very successful treatment of his case (*Lancet*, January 10, 1903) by giving only a teaspoonful every twenty minutes. Of course such very small quantities cannot without danger be continued long, but they almost always have a marked effect in stopping the vomiting, and with a very gradual increase in the size of the feeds it may not return. It is interesting to find that Heubner ("Lehrb. d. Kinderheilk," Berlin. 1903) follows an entirely different plan in this matter. He allows the patient to take as much as he likes every three hours, believing that when he vomits it up again, as he usually does, he probably retains sufficient to nourish him.

(2) The next question is the *choice of food.* Breast-milk is by far the best thing for these children, if it can be got; and in bad cases it should be drawn off and given iced and in measured quantities. If a wet nurse cannot be got, a number of foods, other than cow's milk, may be tried. Gardner made use, in turn, of whey, maltine and barley water, raw meat juice, and albumin water. Others have succeeded with peptonized milk and buttermilk.

(3) The child is to be *kept very quiet.* Unnecessary moving of his body and handling of his abdomen are to be carefully avoided.

(4) *Washing-out the stomach* has been strongly advocated, among others, by Pfaundler, who thinks that it acts by causing a degree of paresis of the muscular wall. It also has the effect of removing the stagnating remains of former meals. Heubner has not found it of much value, but still Ibrahim and most other writers strongly recommend it. A Jacques' catheter (Nos. 12-14) is used, and the water should be between 95° and 105° F. in temperature. Instead of plain-water, Still uses a solution of bicarbonate of soda (2 grs. to the ounce), and Ibrahim a 1-200 solution of Carlsbad salts. The washing-out should not be repeated more than once, or at most twice, a day, as it is rather a tiring process for the baby.

(5) *Nasal feeding* by means of a small catheter was used once with great effect by Batten for twenty-seven days, but has not been practised much by other writers.

(6) *Poultices* are strongly recommended by Ibrahim and also by Heubner. Heubner has the abdomen poulticed thrice daily, and each time four poultices are applied at intervals of half-an-hour.

(7) *Sedative medicines* have sometimes been recommended. Still, Ibrahim and most other writers have seen no great good from their use. Heubner, however, recommends the administration of gtt. 1-10 to 1-20 of tincture of opium (G.P.) along with a few drops of tincture of valerian.

(8) Nutrient enemata are very apt not to be retained and they often set up irritation. *Small rectal injections* of saline solution however, are extremely useful in relieving thirst and are generally very well retained.

(9) *Sub-cutaneous infusion* of sterilized normal salt-solution (¾ per cent.) is of very great value for similar purposes, and may be repeated daily for some time with nothing but advantage.

It is held by some, and among them we find the weighty name of Professor Heubner, that so much can now be done by medical treatment that surgical operation is probably never justifiable. There are not, however, many observers of large experience who go so far as this. Most of those who have seen many cases acknowledge to having seen some whose symptoms were so urgent and so intractable that nothing short of surgery offered any prospect of relieving them.

The question whether any individual case of hypertrophy of the pylorus should or should not be operated on is one of the most difficult and responsible that we can be called upon to answer. In considering it we have to be guided partly by the nature of the treatment the child has already received and the way he has responded to it, and partly by the state of his strength. We have also to take into consideration the child's surroundings and the ability of his parents to provide sufficient skilled nursing to give the medical treatment of the case a fair chance. The possibility of procuring a wet-nurse is another point to be considered, and the special experience of the surgeon who is available to do the operation is an element not to be forgotten.

There can be little doubt that medical treatment should always be given a careful trial before surgical proceedings are thought of. Some improvement can, practically always, be effected by it; and even if it fail to cure the child, it will probably get him into a better state to stand the operation. On the other hand it is to be remembered that only the closest study of the case can justify our delaying the operation. While the child is gaining in weight and strength it is certainly wise to defer surgical measures. Should he begin to go downhill, or even to remain stationary for some considerable time, he should be operated on without delay.

After Effects of Diphtheria on the Heart.—F. W. White, Boston (Journal A. M. A., October 21), from a study of seventy-eight cases of diphtheria with heart complications, after their discharge from the Boston City Hospital, and kept under observation for from five months to a year, and in none of which was there any evidence of heart disease antedating the diphtheria, deduces, in substance, the following conclusions: 1. The cardiac disturbance after diphtheria usually presents the picture of mitral insufficiency with irregular heart action and few symptoms. Occasionally there is only rapid pulse or cardiac irregularity alone. 2. Moderate disturbance of the heart is common after diphtheria and in many cases persists for from two to six months after the original illness. 3. Frequently the cardiac lesion does not clear up in the first half year, but lasts much longer; some patients recover; others probably do not. The duration of the heart trouble is usually in proportion to the severity of the original illness. 4. The fact that only few heart symptoms are often present after diphtheria should not mislead us as to the importance of the injury to the heart. 5. Cardiac disturbance of long duration after diphtheria may be entirely recovered from, and hope should not be given up in individual cases. 6. The treatment of the condition consists in a sufficient period of rest in bed, and then in watching the effects of mild exercise on the heart for several months at least and grading it to meet individual requirements. White hopes to follow up his cases still farther, and, therefore, considers his paper as a preliminary report.

Umbilical Hernia.—M. METZENBAUM (Journal A. M. A., October 28), reports the case of an imbecile dwarf in whom an immense umbilical hernia containing nearly all the smaller intestines, the cecum and a large portion of the omentum, penetrated by pressure necrosis through the abdominal wall without apparent discomfort in the patient. Operation was performed and the hernia reduced, but the patient died of postoperative pneumonia on the fourth day, the abdomen remaining flat with no evidences of peritonitis.

Typhoid Fever in Children.—W. J. BUTLER (Journal A. M. A., November 11. After first reviewing the literature with reference to the frequency, theories of causation, etc., the author gives a clinical analysis of 210 cases of typhoid fever in children, 106 boys and 104 girls. The duration of symptoms, such as restlessness, vomiting, drowsiness, headache, anorexia, fever, etc., before coming under observation, was, on the average, seven days. In 107 in whom the condition of the bowels was ascertainable, 69 had diarrhea, 31 constipation, and in 7 the bowel movements were irregular. Nose-bleed occurred among the preliminary symptoms in only 29 of the 210. After coming under observation, anorexia and furred tongue were the rule. Vomiting occurred in 28 cases, in 13 of which it had been present during the onset. In many cases it seemed to precede more serious symptoms or complications. In 184 patients accurately noted as to this point, constipation existed in 100 and diarrhea in 84. Butler does not ascribe to the former any very special prognostic significance. Tympany of varying degree was usually present after the first week, and in some cases was an annoying symptom extending into convalescence. The spleen was palpable in 134 out of 148 cases examined. Roseola was found in 115 of the 210 cases, seldom before the sixth day of the disease. It was usually absent in the mild and abortive cases. Epistaxis occurred in 12 cases during the course of the disease, in one case several times and with repeated bowel hemorrhages. terminating fatally. The average duration of temperature in all cases was 17.3 days. The disproportion between pulse rate and temperature, first noticed by Roger in adults, holds good for later childhood. but in very young children they run more or less parallel. A dicrotic pulse was seldom found. Blood counts were made in many cases. chiefly with reference to the leucocytes. The weekly averages were as follows: First week, 6,571 ; second week. 7,200 : third week 6,740. The Widal test was made in 96 cases, with 86 positive results. Butler does not consider the negative tests as of much significance, as only one or at most two, trials were made. In 40 patients the reaction was positive within the first four days after coming under observation. In some it was considerably delayed. Nervous symptoms, headache, drowsiness and delirium were rather frequent and there was generally some dullness and apathy. Ehrlichs urinary test was made in a number of cases with usually positive results. Butler does not consider it, however, as of much diagnostic value. Relapses seem to be more common in children than in adults, and in girls than in boys. They occurred in 31 of the 210 cases, in five cases fatal. The mortality, as usual lower in children, was eleven, or 5.2 per cent. Among the more interesting complications noted were ocular paresis in the first week of the disease in one case, several cases of meningeal inolvement, and two cases of neuritis occurring after relapse. In some of the severer cases, evidences of myocardial involvement were present. Intestinal hemorrhage occurred in 13 patients, of whom four died, one from perforation occurring after a hemorrhage. Details of the fatal cases are given. The treatment was symptomatic and hygienic. Butler, from his experience in these cases, is inclined to think that the enlargement of the diet of typhoid patients, advised by some, is unadvisable so far as children are concerned. Milk diluted for infants and very young children, with albumin water, and the usual cereal gruel diluents, such as barley water and rice water as drinks, he thinks, are best for this class of cases. Care in diet during the early part of convalescence is as important as during the height of the attack. Hydrotherapy was also employed, tubbing in practically all cases. The temperature was the usual guide to its employment, also the nervous symptoms which it seemed to benefit. In very severe intoxication, high enemas of salt solution were used with advantage in increasing elimination, especially renal. Intestinal antiseptics, salol, acetezone, etc., did not seem to be of any particular advantage. Two of the four patients with perforation were operated on, but all died.

Umbilical Infection in the New-Born Infant.—C. Porak and G. Durante (Archives de Médecine des Enfants).—Infection of the umbilicus has long been known in its more severe forms. Before the introduction of antiseptics the less serious cases were regarded as physiological. At the present day such conditions as gangrene and erysipelas are less frequent, but abnormalities in the separation of the cord and the healing of the umbilicus are still common. The writers estimate them at 68 per cent. of all cases from 2.6 to 5.45 per cent. Of 28 deaths occurring among 105 infants in the Pavillion des Débiles, 14 were due to umbilical infection. Premature infants are specially predisposed to such conditions both from their diminished resisting power and the slower closure of the umbilical vessels. Infection may occur from contaminated hands, instruments, or dressings and also from the use of baths. Infection of the cord itself usually causes putrefaction and delay in its separation, but in some cases the stump becomes organized forming a tumor which may require removal. The umbilical region may also be infected either before or after the separation of the cord, local inflammatory changes or more serious results from invasion of the lymphatics being produced. Infection of the umbilical vessels may be primary or secondary to the preceding forms, and may be followed by septicemia fatal in from 2 to 5 days. Normally at the separation of the cord the vessels are not obliterated and they are only protected from external contamination by a thin layer of cicatricial tissue. Any organism which may enter finds a ready path of infection in the fluid or coagulated blood which they contain. The fact that grains of dusting powder have been seen in the vessels after the fall of the cord shows the liability to infection by this channel.

The general symptoms consist of fever, persistent gastro-intestinal disturbance with green or whitish motions, jaundice, and erythema. Jaundice is a symptom of special importance and should arouse suspicion of umbilical infection even where there are no local signs. In such cases the necropsy has often shown either abscess along the umbilical vessels or under the liver which may be in a state of acute hepatitis. While loss of weight is frequent in this as in other similar conditions, Durante has shown that in premature infants a sudden increase of weight, especially in the course of an infectious disease when without a corresponding improvement in the general state, frequently indicates the approach of death.

The slightest forms of infection give rise to such clinical conditions as gangrene of the cord, granulations about the umbilicus, seropurulent discharge, or actual hemorrhage, though in all these there is danger from septicemia. Erysipelas is always a serious complication. It appears from the second to the fifteenth day, rarely later, and frequently accompanies puerperal fever in the mother. It is usually fatal at the end of 8 to 15 days. An abscess in the course of the vessels may be impossible to recognize during life. A frequent site is just beneath the umbilical scar where it produces tenderness on palpation, but redness is generally absent. The writers have never seen a case of rupture into the peritoneum, but the infection may invade it by the lymphatics or a fatal septicemia may take place along the vessels. Rupture of the abscess through the navel is not uncommon, and if it occurs early recovery may follow.

Septicemia is often secondary to some of the above lesions though it may occur independently of them. Local symptoms may be slight or completely absent. The course of the affection varies. Death may occur suddenly without premonitory symptoms or with a rapid rise of temperature to 99° or 100°. In these cases there is no localization of the infection. More often in cases rather less acute the infection affects certain organs, such as the liver, heart, lungs, intestine or brain, and a diagnosis of bronchopneumonia may be confirmed at the necropsy while the umbilical lesion is overlooked. Very frequently the organism is arrested in the liver, setting up hepatitis with marked jaundice. When the case is chronic the temperature may fall and the jaundice give place to pallor, but the infant suffers from intestinal symptoms with colorless stools and dies suddenly without apparent cause, the liver being frequently in a state of intense fatty degeneration. Tetanus is not of common occurrence, but where endemic is very fatal. It begins on the fourth day, trismus appears on the seventh day, followed by a fatal result a day later.

In order to avoid infection of the umbilicus, care should be taken to prevent contamination of the cord. It should be dressed with dry sterile gauze or wool which should be renewed when soiled and continued some time after separation. In the less severe cases antiseptic dressings are usually efficacious, but in the graver septicemic conditions treatment must be symptomatic and is often powerless to avert a fatal issue.

Scalp Isolation in the Treatment of Ringworm of the Scalp.—DAVID WALSH, M.D. (Brit. Journal of Children's Diseases, Aug., p. 358).—The following treatment will enable a child suffering from ringworm of the scalp to attend school without danger of infection. The scalp is first shaved, no matter whether there be one patch of ringworm or many; it is then rubbed with turpentine, washed with soap and water, and dressed with a germicide, such as a weak solution of formalin or sulphurous acid. It is then exposed to the x-rays for 10 minutes and finally painted with several coats of flexile collodion containing 10 per cent. of salicylic acid. The use of the x-rays is not essential; a mild irritant application may be substituted. In the next few days a fresh coat of collodion is applied, especially if there is any tendency of the collodion cap to crack. If desired, the cap may be strengthened with a coating of rubber solution, with Unna's zinc-gelatin, with a thin layer of cotton wool, or with strips of rubber adhesive plaster. After a week or 10 days the cap is forced up ⅛ in. by the growth of the hair. It can then be gently stripped off bearing on its under surface the firmly adherent stumps of diseased and healthy hairs. If it cannot be stripped off without causing much pain its removal may be rendered easier by inserting a pair of scissors and snipping some of the hairs. The ringworm hairs are twisted and irregular as they were on the scalp, and some of them are turned white, presumably by the action of the ether in the collodion. The process may be repeated as often as necessary. An objection to the treatment is that collodion is somewhat costly, but no doubt cheaper substitutes, such as rubber solution, may be found.

Application of Alcohol to a Carbolic Acid Burn.—T. J. Swisher (Journal American Med. Assoc., Sept. 2, p. 717). A young woman was carrying parcels, among which was an ounce bottle of 95 per cent. carbolic acid. In some way the bottle was broken, pouring the contents over her hands. As it was dark, she did not at first know what the bottle had contained, and only after the hands began to burn did she take the trouble to wipe off the excess of acid with her handkerchief. After reaching home she applied a dressing of vaselin, and not until over an hour after the burn occurred did the writer see her. A white eschar covered the entire palmar surfaces of both hands as well as the palmar and interdigital surfaces of all the fingers. Sensibility over this surface was entirely absent and the fingers could not be voluntarily flexed. The hands were at once cleansed of the vaselin and put into an alcohol bath and constantly rubbed. After 10 minutes the color began to return, a tingling sensation developed, and the fingers could be voluntarily flexed. The alcohol bath was continued for 20 minutes and all evidence of the burn had then disappeared, except a slight tingling and stiffness of the fingers which persisted for several hours, but which almost disappeared by the following day. Except for a little cracking of the skin over the finger tips, and an unpleasant dryness which persisted for a week, recovery was complete and immediate. The interval between the receipt of the burn and the application of the alcohol is noteworthy.

The Treatment of Chorea with Aspirin.—E. Germonig (Pharm. u. Therap. Rundschau, Mar. 26, p. 41).—Besançon and Paulesco first treated chorea with aspirin. In 10 cases recovery was obtained in three to four weeks. Fifteen grains were given twice daily for five days. After an interval of three days the treatment was resumed for another five days and continued in this way until cure was complete. Görges obtained equally good results in ten cases. According to Sèe's statistics the average duration of an attack of chorea is 2½ months. The writer has used aspirin successfully in 6 cases of chorea.

Case 1.—A girl aged 11, was admitted to hospital on Oct. 8. She had been healthy until 3 weeks previously when choreic movements began.

The movements were of such intensity that standing was impossible. The muscles of the tongue, and of deglutition and phonation were involved, so that articulation was impossible and nourishment difficult. Seven and a half grains of aspirin were given thrice daily and the dose was increased until on the fifth day 46 gr. were taken daily. The treatment was discontinued for 3 days and then 46 gr. of aspirin were given daily for a second period of 5 days. After Oct. 27 no medicine was given and a complete cure was obtained in 3 weeks.

Case 2.—A girl, aged 15, was admitted on Dec. 27. After excitement on Nov. 2 choreic movements began. Speech was unintelligible, and deglutition difficult. She was given bromides without effect. Aspirin was then given, in daily doses of 46 gr., by the interrupted method recommended by Besançon and Paulesco. Three weeks later (on Dec. 30) she was discharged cured.

Case 3.—A woman, aged 26, was admitted on Dec. 29. Three years previously she had been in the same ward for chorea, which persisted for some months. Three weeks before admission, after violent excitement, a condition of general muscular weakness began. After 7 days it was replaced by chorea.

She was in the third month of pregnancy. The choreic movements affected the muscles of the tongue, neck, right forearm and hand, and, to a less degree, the left arm and feet. The muscles of deglutition were slightly involved, and the lips and eyelids were in constant motion. Aspirin was then given in the following doses: on the first day 46 gr.; on the second day a drachm; on the third day 77 gr. After an interval of 3 days the aspirin treatment was resumed for 3 days in the same doses as before. On the tenth day she was discharged completely cured.

Traumatic (Maternal) Birth Palsy.—Herzog (Deutsch. Arch. für klin. Med., Vol. 83, 1905).—The author bases the following conclusions upon statements contained in the literature, and upon personal observation of the condition in an adult female patient. The predominating involvement of the peroneal nerve in this form of palsy, and the distribution of the paralysis in the areas supplied by it, are explained by the topographical situation of the nerve in the pelvis and its relatively considerable exposure. Th external muscles of the leg receive their nerve supply from the lumbar cord alone, the peronei from the lumbar-sacral plexus In traumatic paralysis, with an uniform injury of the entire peroneal nerve, the peronei muscles are least liable to suffer, as offering the least resistance. The forceps is not supposed to be a factor in the etiology of traumatic peroneal palsy, which is to be explained rather by the prolonged duration of labor. The course of these palsies is protracted, and their prognosis not very favorable.

A Contribution to the Study of Progressive Muscular Atrophy in Infancy.—Ritter (Jahrb. für Kinderheilk., Vol. 59, Heft 2).—In two children having the disease death occurred at an unusually early age—fifteen months and two years respectively. The *family* type was absent in both cases. A rather extensive lipomatosis was found post-mortem in the muscular tissue, whereas fatty degeneration and infiltration used to be a minor factor in the earlier observations. In a general way, both cases resembled the Hoffmann-Wernich type.

"Contracted" Muscles of Infantile Paralysis.—F. R. FISHER (Lancet, August 26, 1905) says: In the early state of infantile paralysis, when it is seen that one set of muscles is in better condition than the opponents, much may be done to prevent the former from becoming intractile. Such movements of the foot upon the leg as will bring the stronger muscles to a full degree of normal relaxation should be practised regularly. "Passive exercises" are valueless, a due use of the muscles is imperative, and with very young children it requires some little ingenuity to get what is wanted in this respect. Should some intractility of the fibres be already established and the full degree of relaxation not be obtainable, exercises are again to be employed, but no forcible extension of the fibres must be attempted. Gentle handling is very necessary; violent measures will be met by obstinacy. A well contrived appliance can be obtained which will offer resistance to the pull of any one muscle. When such remedial measures fail to prevent the development of intractility or overcome the defect, then tenotomy must be resorted to.

Typhoid Fever in Children.—W. C. HOLLOPETER (Journal A. M. A., September 23), mentions the difficulties of diagnosis in typhoid in children and some of the characteristics of the condition, such as the frequent enlargement of the spleen. which is an important point. The Widal test and the diazo reaction are of value only at the beginning of the second week, when other characteristic symptoms aiding in the diagnosis are also present. In most cases he thinks the disease is only recognized about the tenth day, and then only by a process of elimination. For clinical purposes, typhoid fever may be regarded as a general sepsis and the two elements necessary successfully to combat it seemed to him to be reduction of the toxemia and a sufficient supply of food and fluid. The first step in treatment is quiet for the patient and the administration of calomel. He emphasizes the value of enteroclysis, which he orders daily unless contraindicated. It reduces the toxemia and the temperature and supplies the much-needed fluid to the body. He insists on the importance of the physician giving special attention to this and instructing the nurse as to its proper administration. The solution for washing the bowel he varies to suit the needs of the patient, adding such medication as seems proper. Other methods more or less to be depended on are ice bags to the head, and to the heart if fever is high, careful attention to the condition of the nose and mouth, change of position to prevent pneumonia, etc. He has practically abandoned sponging every two hours, when the temperature goes above 102.2 in favor of the ice bags and hot water. Diet is reduced to peptonized milk and albumin water, and Hollopeter believes in a free administration of liquids. He keeps the patient in bed and on a liquid diet for ten days after the temperature falls to normal. The chief point of his paper, however, is the value of enteroclysis in typhoid, and its careful technique by the attending physician.

Feeding in Infancy.—W. P. NOTHRUP (American Medicine) discusses the methods of feeding a baby deprived of Nature's best feeding, a breast milk. The best substitute food is prepared from cow's milk from healthy herds, the milk collected clean, modified in clean surroundings and used fresh. The laboratory method of exact modification of milk has been called the American method. Modified milk is not a patent food, but nourishment as near as possible such as the human breast furnishes, and capable of being modified or changed to fit the changing needs of the inafnt. The proper modification can be made only by skilled persons in a proper laboratory. The cost of laboratory milk is within the reach of all who are willing to do part of the work of dividing the quart bottles of milk into separate feeding bottles. The prescriber has responsibilities in feeding a baby. The feeding of infants is an expert's work. Three prescriptions may serve as points of departure: (1) For the new-born—to begin after the fifth or seventh day: Fats, 2 per cent.; sugar, 5 per cent.; proteids, 0.50 per cent.; feedings, 10; amount in each feeding 1 oz.; alkalinity, 5 per cent. Heated to 155 degrees Fahr. for 20 minutes, or raw if preferred. Feed every two hours, twice at night. (2) "Low average" breast milk: Fats, 3 per cent.; sugar, 6 per cent.; proteids, 1 per cent. (3) "High average" breast milk; Fats, 4 per cent.; sugar, 7 per cent.; proteids, 2 per cent.

Pancreatis in Mumps.—PROF. G. H. LEMOINE and M. F. LAPASSET (Bulletins de la Société Médicale des Hopitaux, July 7, p. 641). M. Simonin has insisted on the frequency and special symptomatology of pancreatis in mumps. As the cases generally run a benign course, no opportunity is given for a necropsy. The following case is the first on record in which one was performed. A soldier, a native of Algiers, aged 19, was admitted to hospital on Oct. 2, 1902, suffering from mumps. The case ran a benign course, the temperature not rising above 100.2° and becoming normal on the fifth day. On the eighth day the illness appeared to have terminated, but on the evening of the tenth day there was a rigor with a rise of temperature to 103.8° and pain and swelling in the right testicle. The orchitis rapidly subsided, the temperature became normal on the fourteenth day, and the patient was again pronounced convalescent; but on the morning of the fifteenth day he complained that he had not slept and that he vomited several times during the night. Although the temperature was normal he appeared to be prostrated. The conjunctivæ showed a slightly icteric tinge. The upper abdomen was tender, especially in the epigastrium and the region of the gall-bladder, where the patient had a feeling of weight. The spleen was enlarged and tender. The pulse was 52 and the axillary temperature was 97.3°. An aperient was given but it was vomited. On the sixteenth day the icteric tint involved the whole skin and the discoloration of the conjunctivæ was more marked. Vomiting had become more frequent and the intolerance of the stomach was absolute, all liquids being rejected. The hepatic and splenic regions were very painful, especially in the region of the gall-bladder, which organ appeared to be enlarged. The temperature and pulse remained the same. An injection of 1,000 gm. of saline solution was ordered in order to provoke diuresis, as the kidneys had ceased to act since the previous day. In the evening the general condition seemed to have improved. Vomiting had occurred only once during the day. 80 gm. of brownish-red urine containing 1 gm. of albumin per liter and an abundance of biliary pigments had been passed. The patient continued to be very prostrate and spoke of his approaching death. In the night the vomiting recurred and was uncontrollable. At first the vomit was black, then it gradually became sanguineous. There was also constipation. On the seventeenth day the hematemesis was incessant and the patient lost consciousness. The pulse rose to 120 and the temperature to 101.5°, the jaundice became deeper, and death occurred. NECROPSY.—All the tissues had an icteric tinge. The liver did not appear to be enlarged but was much congested; on section it looked like a "cardiac liver." Some lobules seemed to be in a state of incipient degeneration. The gall-bladder was voluminous and edematous. This edema extended as far as the beginning of the common bile duct where an enlarged gland pressed on the latter and appeared mechanically to produce the edema of the gall-bladder and the icterus. The bile in the gall-bladder was brownish, thick, and very viscid. The stomach contained black fluid; its mucous membrane was spotted with fine ecchymoses which extended to the first part of the duodenum. The pancreas was greatly enlarged, edematous, and congested. It weighed 190 gm. and was of a reddish-gray color. In the region around the pancreas, the duodenum, and the hilum of the liver, were swollen lymphatic glands. The spleen was enlarged and weighed 1,200 gm. The kidneys were a little congested and the capsules were adherent in places. Microscopic examination of the liver showed proliferation of the connective tissue surrounding the biliary canaliculi and nodules composed of embryonic cells. The spleen also contained similar nodules and its capsule and trabeculæ were thickened. In the kidneys lesions were limited to the convoluted tubes, the cells of which showed signs of granulo-fatty degeneration and the lumen of which was filled with epithelial débris. The cells and acini of the pancreas were abnormally large but the islands of Langerhans were diminished, being compressed by the turgescent tubes. The nuclei of the pancreatic cells stained badly and many of them were vesicular. The complexity of this case is remarkable. Not only was there epigastric pain which was the principal symptom of the pancreatitis, but the gall-bladder was tender and the spleen was enlarged and tender. There were symptoms of grave icterus—hematemesis, prostration, subnormal temperature, and elevation of temperature at the time of death. The embryonic nodules in the liver and spleen and the cellular degenerations are common to all infectious processes. Were these lesions due to the infection of mumps or were they the result of a biliary infection consecutive to the obstruction of the bile duct by the enlarged pancreatic lymphatic glands? The early appearance of the icterus is in favor of the former view.

Congenital Word-Blindness.—C. J. THOMAS (The Ophthalmoscope, Aug., p. 380).—The different portions of the cerebral cortex vary in the same individual in potentiality for organization, and most adults fall into one or other of the definite memory types—auditory, visual, or motor. If the power for organization of one center is very low, defect is noticed when formal education is begun, if not before, and thus we have classes of children presenting congenital word-deafness, word-blindness, amusia, idioglossia, etc. The credit of pointing out cases of congenital word-blindness rests largely with ophthalmic surgeons, such as Hinshelwood, Nettleship, and Stephenson. Since the London County Council issued an instruction to head teachers to submit to the medical officer every child of the age of 7 who appears backward or defective, a great number of cases of word-blindness has been brought to light. The writer calculates that nearly 1 in 2,000 of London elementary school children has word-blindness to a considerable degree. It seems to be most frequent in the lower classes and, like the allied condition of idioglossia, amusia, and congenital word-deafness, frequently assumes a family type. It occurs more frequently in boys than in girls. The following is an example—A boy, aged 7, was admitted to a special class in 1901. He was clever in all handiwork and had good powers of observation and reasoning but could not remember how to make the letters. In 1904 he was bright and intelligent and could do difficult sums in mental arithmetic, but all attempts to teach him to read had failed. But he could read Arabic numerals and do sums in multiplication. He said that the written word "not" stood for "one"; "buds" he read as "branch"; and "horse" he could not read (he mistook "r" for "b"). But he recognized all these words when spelt aloud. In 1905 he could with difficulty make out a few words of 3 letters, which he did by tracing them out with his finger, thus utilizing a form of kinesthetic memory. In less serious or partial cases, if the child is intelligent, other centres in the brain may be used as a help and the child may pass muster but not become a fluent reader. In one case the child was of brilliant capacity and became an excellent surgeon. He practically did no reading but acquired all his knowledge at lectures and classes. The treatment consists in placing the child in a special class in which he can receive individual attention. The initial difficulty in learning the letters is due to the fact that the 26 signs are too numerous to be learnt and retained unless used in word-building. On the other hand, as Hinshelwood has pointed out, the recognition of Arabic numerals is readily acquired. Letters should be taught from large signs and the child should be encouraged to copy them. The ordinary individual recognizes words as a whole without troubling to recognize individually the letters of which they are composed. His visual word centre is therefore stored with memories of words. There is a method of teaching to read, termed the phonic, which has been elaborated by Miss Dale of the High School, Wimbledon. The children associate from the beginning the form of each letter with the mechanism for producing the most usual sound for which it stands; thus each word is pronounced without calling upon the visual word center at all, and the meaning of the word is arrived at from motor and auditory memories. Miss Dale has devised a series of reading books in which only regularly phonetic words are met until the child is considerably advanced. A word-blind child should commence to read on this plan, and should progress fairly readily up to the time at which irregular words are introduced and ideographs become necessary. Then other memories must be invoked and a study of each child will show in which direction help is to be sought. When the particular memory is found it must be encouraged to the utmost; it will often prove to be a kinesthetic memory. One child, by rapidly spelling the letters with the lips, will arrive at the meaning of the word, another will trace the letters in the air or on the book with the fingers, and thus arrive at the meaning. In one of these ways an intelligent word-blind child may acquire some power of reading, even when the visual word center remains poorly developed.

Fatal Acute Chorea.—LÉAUTÉ (Jour. de Med. et de Chirurgie Pratiques, July 10, p. 503).—Although acute chorea is rarely fatal, some 20 cases have been recorded. Death is most frequently due to cardiac complications, but may also result from complicating infective processes or from severity of the nervous symptoms. Although some of the fatal cases have appeared benign at the outset they have more usually been remarkable for their severity from the beginning. The patients of Barié and of Dupré and Camus died 5 days after the symptoms began. Murchison recorded a death at the end of 130 hours. The duration of the affection is more usually 10 to 15 days and rarely exceeds 6 weeks. The characteristic movements may supervene alone or be accompanied by fever, either as a primary condition or during convalescence from an attack of acute rheumatism. The movements may then increase in violence till death occurs; or they may cease and a state of coma precede the fatal issue. In some cases there is a remission of variable duration which is followed by death on the recurrence of the convulsive seizures. The temperature and pulse-rate rise with the intensity of the movements and approach the normal during the remissions. An important prognostic symptom is the occurrence of an eruption of variable type, frequently scarlatiniform, which has been observed to precede death in a considerable proportion of the cases. Other unfavorable signs are cardiac lesions, dyspnea, dysphagia, or grave mental symptoms.

The Treatment of Anterior Poliomyelitis by Nerve-Anastomosis.—Hackenbruch (Deutsche Med. Woch., June 21, p. 986.—The writer has treated 3 cases of paralysis of the peroneal nerve due to acute anterior poliomyelitis by nerve anastomosis. The external and internal popliteal nerves were exposed by a longitudinal incision about 3 in. in length through the skin and fascia. The trunk of the internal popliteal or posterior tibial nerve was split longitudinally for about 1½ in. The part split off was about one-third the thickness of the divided nerve and remained attached at its upper end to the internal popliteal trunk. The lower end was freed and fixed by a few fine sutures into a slit made in the peroneal nerve at a corresponding level. The external wound was closed, except for a gauze-drain, and dressed, and the joint was immobilized for 10 days by splints.

Case 1.—A girl, aged 2 years, had had an attack of infantile paralysis at 9 months. There were right talipes equino-varus and complete paralysis of the muscles supplied by the right external popliteal nerve, which did not react to the strongest electrical current. On Feb. 24, 1903, the popliteal nerves were exposed; the internal popliteal and tibial nerves were of a whitish-yellow, and the paralyzed peroneal nerve was of a whitish grey color. A portion of the internal popliteal nerve was joined by a few fine sutures through the perineurum to the peroneal nerve in the manner described above. The wound healed by first intention, and some moths later the equino-varus position was less marked and walking was less clumsy. The cicatrix in the popliteal space assumed a keloid condition. The initial improvement was not maintained; the muscles supplied by the peroneal nerve did not regain their excitability and the ultimate gain was about equal to that obtained by tenotomy of the tendo Achilles, i.e., the partial division of the internal popliteal nerve had diminished the spastic contraction of the calf-muscles. The failure was probably due to the formation of keloid round the sutured nerves, which prevented the penetration of the nerve-fibrils into the paralyzed nerve-trunk. This occurred also in the following case.

Case 2.—A boy, aged 1 year, was seen. At the age of 3 months he had acute poliomyelitis. The entire musculature supplied by the right external popliteal nerve was completely paralysed, and did not react to electricity. The gastrocnemius, especially in the centre, was also weak. The right lower limb was 2-5 in. shorter than the left. Slightly more than a third of the thickness of the posterior tibial nerve was joined to the external popliteal. Some improvement took place, but was not fully maintained, though 18 months after the operation the child could walk in boots without the right foot bending inwards. A keloid condition of the scar supervened and the paralyzed muscles did not react to galvanism or faradism. The wound was re-opened. The anastomosed nerves were embedded in a firm cicatricial mass, through which no nerve-fibres could penetrate. A second anastomosis was performed higher, beneath the internal margins of the semi-membranosus and biceps. The fascia of the two muscles was sutured over the anastomosis in order to prevent any keloid of the cutaneous cicatrix penetrating to the nerves. The cicatrix around the former anastomosis was not excised as the cutaneous keloid was disappearing, and it was hoped that that around the nerves might also be absorbed. If this does not occur, and the result is not satisfactory, the writer intends to excise the fibrous tissue in which the nerves are imbedded.

That the method is capable of excellent results, providing suppuration and keloid formation are avoided, is shown by the following case:—

Case 3.—A girl had, at 18 months, an attack of acute anterior poliomyelitis, in which the left leg became paralyzed. At the age of 12 years, in Aug., 1903, the entire left lower limb was weak and atrophied, and the skin, especially of the leg, was colder than that on the right side. The left leg was 1 1-5 in. shorter and the left foot was smaller than the right. In walking the toes were first placed on the ground and then the foot turned inwards in the varus position. Both peronei and the extensor longus and brevis degitorum pedis were paralyzed, and did not react to a strong faradic current.

On Aug. 19, 1903, the popliteal nerves were exposed. The external was of a greyish-white color and atrophied. Slightly less than one-third of the thickness of the internal popliteal nerve was freed and transplanted into a slit in the peroneal nerve. The wound healed by first intention, and a few weeks later the patient was discharged with a small leather splint. On Dec. 28 some active abduction of the left foot was possible. The paralyzed muscles did not react to faradism or galvanism directly, but reacted if the stimulus was applied to the internal popliteal nerve above the ham. On May 13, 1904, the left foot could be extended and abducted with some force, but the muscles still did not react directly to electricity. They reacted, however, if the stimulus was applied above or on a level with the ham. On Sept. 27, 1904, the stimulus could effectually be applied as low as the head of the fibula. On Feb. 11, 1905, 18 months after the operation, the paralyzed muscles reacted to the cathode of a galvanic current, though not to faradism. The left leg and foot were useful and could be moved freely in all directions. The leather support was no longer required, and she could walk for an hour without much fatigue. She could stand on tip-toe and stand on the left leg alone without the ankle giving way. A callosity which had previously been situated on the outer side of the foot as the result of walking in a varus position had disappeared. The left leg had increased in length and was only 4-5 in. shorter than the right. The left leg was weaker and thinner than the right, but, as all the muscles acted harmoniously, further improvement was anticipated.

For success in nerve-anastomosis healing by first intention is essential. Even then the result may be vitiated by the formation of keloid. The writer suggests that it might be possible to prevent the spread of a keloid in the cutaneous incision to the nerves by making the incisions of the skin and fascia at different levels. Especially in anastomosis between the two popliteal nerves it would be advisable either to make a semicircular incision above the bend of the knee or to perform the anastomosis at a higher level beneath the bellies of the semi-membranosus and biceps. The healthy nerve fibres should be implanted in the degenerated trunk without the least tension, and the sutures should, if possible, pierce only the perineurium of the healthy nerve. It is not easy to decide what proportion of the healthy nerve should be split off for junction with the degenerated trunk. If too much is taken the motor function of the muscles supplied by it is unduly impaired. Slight initial impairment is beneficial as it tends to lessen spasmodic contraction. As the internal popliteal nerve is normally twice to thrice as thick as the external, it suffices to use one-third for anastomosis.

Thymus Gland in Children.—Brickdale (Lancet, Oct. 7, 1905).—The author summarizes his article as follows: 1. The usual weight of a microscopically normal thymus in a child under 1 year is under 100 grains. 2. Children suffering from "primary atrophy" or marasmus commonly, but not always, exhibit fibrotic changes in the thymus; the weight and size of the organ are also usually diminished. 3. Children suffering from "secondary atrophy" exhibit similar changes, but they are not so constant. 4. Possibly some other factor than mere malnutrition or starvation may produce these fibrotic changes, as in a case in which pure starvation was produced by congenital stenosis in the alimentary tract they were not observed. 5. In cases of acute illness in children, fibrosis of the thymus may accompany general wasting. It is difficult in these cases to exclude previous disturbances of nutrition, at any rate among hospital patients. 6. Enlargement of the thymus and other lymphatic structures in the body may occur as the result of acute toxic absorption (as in diphtheria) or a more chronic condition (as in lymphatism). In these enlarged thymus glands eosinophile cells are numerous, but no special types are peculiar to either class. 7. In some conditions, especially in tuberculosis, cells with basophile or neutrophile granules seem to replace the eosinophiles. 8. In congenital heart disease eosinophiles are not found in the thymus. 9. True hyaline degeneration very occasionally occurs in Hassal's corpuscles. 10. Fatty degeneration of the cells is common and appears often to affect the peripheral zone of the lobules.

Enlarged Spleen in Pediatrics.—CARRIÈRÉ (Presse Medicale).—The author discusses the various conditions liable to entail enlargement of the spleen in infants and differentiates a case under observation as splenomegaly with pseudoleukemic anemia in a rachitic child, aged 20 months. The possibility of a syhpilitic origin for the condition imposes the necessity for specific treatment supplemented by nourishing food and tonics.

Treatment of Intestinal Affections in Infants.—SALGE (Berlin Klin. Woch., Aug. 28, 1905). The author merely reviews the present status of treatment of intestinal affections. In those due to too much food at a time and too short intervals between, without organic changes, he states that all food should be stopped and only as much weak, black tea given as corresponds to the amounts of the preceding feedings. If this starving for twenty-four hours is not enough, calomel can be given in doses of from .02 to .05 gm. every two hours until three doses have been taken. It is best to substitute some other food for the milk for a time afterward. When the stools become less fluid and generally dark-brown in color, after three days of flour feeding, milk can be resumed. If a tendency to vomiting and loss of appetite persists, the motor function of the stomach should be examined. This can be done by siphoning out the stomach three hours after a meal to find out whether it is empty or contains free hydrochloric acid. If not empty, the stomach should be rinsed, which is a simple matter in an infant. A 1 per cent. solution of Carlsbad salts is admirable for the purpose. The appetite sometimes returns surprisingly after lavage of the stomach, and he sometimes uses it for this indication alone. When the anorexia is persistent, pepsin or hydrochloric acid or bitters might be tried or a mixture of 1 part tincture of strychnin and 2 parts of fluid extract of condurango in 10 parts of tincture of wine of rhubarb. Five drops of this mixture are given three times a day, fifteen minutes before the meal. When the dyspeptic disturbances are severe, the symptoms of intestinal catarrh suggest a serious intoxication of the system. Here the main indication is to sustain the heart. If the tendency to collapse can be controlled, the children recover in apparently desperate cases. Large doses of camphor are required, from .1 to .2 gm. at first and then from .05 to .1 gm. every two hours. All food should be suspended and only enough tea given to moisten the mouth. The loss of water is compensated by subcutaneous saline infusions twice a day, injecting from 120 to 150 c.c. of a .9 per cent. salt solution, or, better still, a solution of .5 salt and .5 sodium bicarbonate in 100 parts water. The high temperature is combated by wrapping the child from head to feet in a sheet wrung out of cold water (not room temperature) and covering with a blanket. After from ten to fifteen minutes another sheet is applied in the same way, repeating the procedure about five times. In case of collapse the child must be artificially warmed, even putting it in an incubator if necessary. After the infant has recuperated from the tendency to collapse, feeding should begin again, but without any fat in the food. Breast milk is liable to contain too much fat, and the child may relapse if placed at the breast, the collapse being fatal in this case. Salge has had excellent results from the use of human milk from which the fat has been removed. This is possible only when an abundance of human milk is at disposal, but it has saved many infants in his experience who otherwise would have been doomed. When human milk with fat removed can not be obtained, the tea should be continued for days and the breast milk should be drawn and given by the teaspoonful, in small amounts, not more than 50 c.c. the first days and increasing this amount very slowly and cautiously. The result is not so certain as when skimmed breast milk can be given. If no breast milk is available the tea diet should be continued for two or three days and then thin flour and buttermilk and diluted milk made with some preparation of malt should be given during convalescence. Cholera infantum is merely a severe form of intestinal catarrh and the indications are the same. Nephritis is the principal complication to be feared.

Congenital Myxedema.—Argutinsky (Berl. klin. Woch., Aug. 28, 1905). the author gives illustrations of a child with thyreoaplasia inducing congenital myxedema, showing the great benefit derived from fifteen months' thyroid treatment. He calls attention to the remarkable lowness of the umbilicus in the child before treatment and the gradual rise of the umbilicus to its normal position as treatment progressed. He has found a dozen other cases illustrated in the literature. the pictures showing the umbilicus remarkably low on the abdomen. When thyroid treatment is not instituted, the children grow up with this anomaly, but in the illustrations of children thriving under thyroid treatment the umbilicus seems to have risen to its normal location.

Infantile Multiple Sclerosis: Familial Sclerotiform Heredosyphilis.—S. Sanctis and G. L. Lucangeli made a careful study of this subject in the laboratory of the School for Backward Children, Rome, Italy. Three cases are reported in detail. They had all in common slight insufficiency of the facial nerve, sluggish deep reflexes, torpid motility, and hypotonia of the lower limbs; strabismus and nystagmus, intention tremor, defective gait, scanning speech, bradylalia, arrest of development of speech, and insufficient mental development. Romberg's sign was present in two of the cases. The gait in one was ataxic; in two, ataxispastic. In the authors' opinion it cannot be definitely stated that there is such a disease as familial infantile multiple sclerosis, but it may be stated that a sclerotic form of cerebrospinal heredosyphilis exists, and is of frequent occurrence during infancy. It should not be confounded with true multiple sclerosis. The course of the disease and the ophthalmoscopic findings are of the utmost importance in making the diagnosis. An exhaustive bibliography is appended.

Diphtheria.—Renney (Pub. Health, London, vol. xvii, No. 2). Dr. Renney, Medical Officer of Health for Sunderland, gives the history of two outbreaks of that disease, which tends to show that the possible source of infection was the dust from floors, walls, etc. In Sunderland, during the last ten years the average notifications of diphtheria have been 48.6 per annum, but in the first quarter of the year (1905) fifty-five cases were notified. On investigation, it was found that most of the children attended the Council Schools, nine of the cases having occurred in children from one classroom of the infant department of one of the schools. On March 21st disinfection by formalin vapor and formalin spraying was carried out in this department, and there had only been one other case notified in the department up to May 12th. As that case was notified on March 24th, it had probably been infected prior to disinfection of the department. It had been intended to take swabs from the dust of the floor and from the top of the door prior to disinfection, but disinfection had been performed before the medical officer knew of it. Swabs taken from these situations after disinfection gave negative results. Dr. Renney does not "assume that the source of infection was to be found only on the floors, walls, and desks of this classroom," but thinks "it is a very significant fact that since March 21st there has not been another case there." On November 25th, 1904, a boy was admitted to Sunderland Borough Sanatorium suffering from scarlet fever. He had, however, in addition, a very suspicious throat, and 2,000 units of diphtheria antitoxin were administered, and he was placed for observation in a pavilion by himself. Swabs from his throat showed the presence of the diphtheria bacillus. He made a good recovery, and a month later, as he was still peeling, he was returned to the scarlet fever pavilion, which had just been thoroughly disinfected. On January 22nd, 1905, a nurse, who had been working in the male ward of this pavilion, developed diphtheria. She was removed to the isolation block, and disinfection was again carried out. On January 31st, a boy, who had been admitted into the scarlet fever pavilion on December 22nd (after the pavilion had been disinfected), developed diphtheria. He also was removed, and disinfection of the pavilion was again carried out. On February 6th the diphtheria bacillus was found in the healthy throat of a child in the ward, but no further development then took place. On March 24th diphtheria occurred in another scarlet fever patient admitted on March 9th. He was removed, and the pavilion emptied of the other patients. Swabs were taken from the dust on the top of the door, and also from the crevices in the floor, and diphtheria bacillus was found in both instances. Swabs taken from these positions after thorough disinfection of the pavilion with formalin gave negative results.

Dr. Renney has no doubt from his experience that a certain percentage of scarlet fever patients have diphtheria bacillus present in the throat on admission, and although most of them do not develop diphtheria, they yet act as "carriers" to others. He thinks it "a matter for serious consideration whether all scarlet fever patients should not first be admitted into an observation pavilion, where swabs could be taken, and the patient detained until the swabs showed a negative result; they could then be sent to the scarlet fever pavilion."

PNEUMONIA.—"The pneumonia season is rapidly approaching. Soon the various journals will be full of statistics of past years in regard to the prevalence and fatality of this disease. The pathology and etiology will be thoroughly gone over, but, judging by the past, most writers will have very little that is encouraging to say as regards treatment.

"Several points, nevertheless, must be kept in mind. Whatever drugs are used internally (and this depends very much upon the individual case), the patient must have plenty of fresh air. Do not be afraid of his taking cold on account of the cold air blowing across his face. It is now considered that this is impossible. Also, whatever drugs may be used, keep the body warm with suitable clothing, and use externally some preparation which will cause a comparative lessening of blood-pressure in the lungs. Cold applications, beside lowering the vitality of the patient, cause a depletion of the superficial vessels and consequently increase the hyperemia in the lungs themselves. Our attention then would be drawn, per contra, to hot applications. To the most of these there are very great practical objections, such as their inconvenience, their tendency to grow cold very rapidly, and the fact that they must frequently be renewed, thereby disturbing the patient's rest to his manifest detriment.

"We have found but one form of hot application which seems to us to entirely fill the bill, and that is Antiphlogistine. By its means the vitality of the body is conserved, the blood is attracted to the surface and away from the lungs (its hygroscopic action remarkably enhancing this effect), and the tone of the heart's action is maintained. Beside this, its frequent renewal is not necessary, and the patient's rest is not thereby disturbed. Practically we know that by its use the patient is made much more comfortable, the fatality is much decreased, and if abortion of the disease is possible, we believe it can be accomplished better by this means than by any other."

—Kansas City Medical Record, October, 1905.

BETTER RESULTS THAN FROM ANY COMBINATION.—I must say that NEUROSINE has given better results and more universal satisfaction than any combination ever used by me. I have tried it in many nervous affections and in Epilepsy of long standing. In some it is a specific, in others a therapeutic agent of great value.

W. L. GAHAGAN, M.D.
Coroner of Hamilton County, Chattanooga, Tenn.

BEST UTERINE TONIC AND ANTISPASMODIC.—Dioviburnia is the best uterine tonic and antispasmodic, relieving the pains of Dysmenorrhea and regulator of the uterine functions. I cheerfully give this recommendation of Dioviburnia.

L. CH. BOISLINIERE, M.D.
Late Professor of Obstetrics, St. Louis Medical College.

PEDIATRICS

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ORIGINAL ARTICLES

THE EMPLOYMENT OF CITRATE OF SODIUM IN INFANT FEEDING.*

By F. J. Poynton, M.D., F.R.C.P., London,

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Dr. Poynton brought forward in his paper the results of another year's experience of a method of infant feeding in which sodium citrate was added to cow's milk. In his first contribution, which had been published in the Lancet, May, 1904, he had pointed out the earlier work of Arthus and Pages, and A. E. Wright, to the latter of whom he was indebted for the suggestion.

The principle of the application of this method was simple, and consisted essentially in adding to cow's milk citrate of sodium in the proportion of one or two grains to the ounce of milk.

If an ounce of milk is taken, and to it is added a minute quantity of hydrochloric acid, sufficient rennet, and to that two grains of citrate of soda, and it is then placed in an incubator at body temperature, a fine, loose clot will be formed—a clot very different from the firm, tenacious clot that is formed when the citrate of soda is not added.

The explanation of this difference is disputed. The author has been informed by competent chemists that the acid caseinogen combines with the sodium of the sodium citrate to form a sodium caseinogen, which is of lower molecular weight than calcium caseinogen, the usual compound that is formed in milk curdling. The calcium thus combines with the citric acid to form calcium citrate, which was gradually absorbed into the system, being much diluted by the stomach contents.

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*Abstract of a paper read at the Leicester meeting of the B. M. A., July, 1905.

On the other hand, other chemists had denied the validity of this, and some held that citrate of sodium had no more influence in altering the milk than such salts as sodium bicarbonate. With this conclusion Dr. Poynton did not agree. He had tested in the laboratory sodium bicarboate, citrate of potash and salicylate of soda, and had not seen with these such an alteration in the milk clot as he had observed with citrate of soda. He had looked out a simple and eminently practical method of using this milk, and now used it largely in his out-patient department at the Hospital for Sick Children, Great Ormond Street.

Citrate of sodium was very soluble in water; to the extent, in fact, of twenty grains to the drachm. Accordingly it was dispensed in water, with a drop or two of spirits of chloroform added. The object of this dilute chloroform was to prevent the tendency that dilute solutions of salts showed to develop a slight mouldy growth in them.

If the child required, for example, three ounces of milk at each feed, and the physician was giving two grains to the ounce of citrate of soda, the prescription would be six grains of citrate of soda in a drachm of water, to be added to each feed. If larger feeds were taken and more citrate was needed, the same amount of water would be sufficient, for, as above stated, citrate of sodium was very soluble.

Since the writer's first paper in the Lancet, Burroughs Wellcome have prepared some convenient tabloids of citrate of soda, but at present they do not seem to be quite as effectual as the fluid, though their convenience to travellers is obvious.

There was one little point about this method simple enough in itself, but not infrequently neglected, namely, that when the amount of milk was increased the citrate of sodium must also be increased in proper proportion. Dr. Poynton used this treatment for weaning healthy children where the mother's milk failed, for milk dyspepsia, and for giving milk in a more concentrated form to babies. It was remarkable how dilute the milk that was given to children might be, and how long this dilution might be persisted with. Not only this, but where there had been milk dyspepsia he had known children kept on barley water alone, even for months! If citrated milk was well taken, regardless of the age of the child, he steadily pushed up the strength of the milk, increasing the citrate of sodium in due proportion until at least two parts of milk were given to one of water. When once this point had been reached and the condition was satisfactory, the citrate of sodium could be gradually diminished.

This salt was not unpleasant to the taste, and did not materially affect the reaction of the milk—two great advantages in its use; and moreover, it was very cheap. One difficulty might arise, constipation, but it could be easily put right by appropriate treatment. His experience of the method was now considerable, for he had used it steadily for about two years. Each child was weighed every week, and the amount of milk and citrate revised in this way. A routine method of procedure was obtained which was a great advantage to the physician and patient. This method did not prove invariably successful, and it was not pretended that it did. It dealt with the curd of milk, and, as was well known, it might be the fat and not the curd at fault; or, again, cow's milk might be quite impossible for some children, and its use had then to be abandoned. Nevertheless, as a routine and cheap method, in the writer's opinion the employment of citrate of sodium was really valuable.

TWO EYE DISEASES OF CHILDREN OF INTEREST TO THE GENERAL PRACTITIONER.[1]

H. C. MOFFETT, M. D., OF CLINTON, IA.

There are two diseases of the eye which as a rule predominate so exclusively before maturity and in early childhood that I think we can with propriety classify them as eye affections of children.

The diagnosis and therapy of these diseases is not confined to the specialist for the simple reason that the majority of these cases come first under observation of the general practitioner, and frequently are the result of a marked malnutrition following such diseases as whooping cough, diphtheria, measles, which he has previously been called upon to treat.

The diseases which I desire to refer to briefly are phlyctenular keratitis and phlyctenular conjunctivitis. As they are the result of the same pathological process they will be considered together. The synonyms for these affections are numerous, and in order to avoid confusion will not be mentioned. Suffice it to say that the names given are those usually employed by oculists in the middle West. Inasmuch as the diagnosis and rationale of treatment depend so essentially upon an understanding of the pathological conditions present, I will, with your kind forbearance, call attention to the principal histological elements of the cornea in order to freshen our memories relative to this important structure and aid in a clear conception of the simple pathological processes that take place in these diseases. The cornea consists of five layers, viz.: The anterior epithelium, Bowman's membrane, substantia propria, Descemet's membrane and the posterior endothelium.

The anterior epithelium consists of several layers of pavement and cylindrical epithelium which, by the way, thin down perceptibly at the central portion of the cornea and are nearly twice as thick near the limbus. This fact is of considerable practical importance in the consideration of ulcers and the removal of foreign substances.

Bowman's membrane, as you will see in one of the sections under the microscope, appears as a white line lying underneath the anterior epithelium. It is a homogenous special condensation of the substantia propria and may be regarded as a basement membrane somewhat analogous to that of the skin. Fortunately it differs from the anterior epithelium in being much thicker at the central part of the cornea. It should be remembered that ulcers that penetrate this membrane leave scars and opacities. The substantia propria is probably nine or ten times thicker than all the other layers of the cornea put together and is composed of lamellæ of interlacing bundles of fibrous tissue which enclose a great number of intercommunicating lymph spaces. Penetrating wounds and ulcers that reach this layer leave permanent scars and opacities. Lying posteriorly to the substantia propria is Descemet's membrane which is another clear homogeneous structure somewhat similar to Bowman's. It is very resistant and often protects the interior of the eye from perforation of the cornea due to ulcers. It is lined by a single layer of cells—the posterior endothelium—which you will notice, in the microscopic section, appear as small dots forming the posterior layer of the cornea and the anterior wall of the anterior chamber.

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[1] Read before the Clinton County Medical Society, Clinton, Iowa.

Phlyctenular conjunctivitis begins as a small nodule in the conjunctiva at, or at least very near, the margin of the cornea.

It is due to an efflorescence of round cells which raise up the epithelium of the conjunctiva and then break down to form small ulcers.

Two or more of them generally coexist, and occasionally the entire cornea may be surrounded by them. At the time that these small elevations can be seen, it will be noticed that a number of adjacent conjunctival vessels are running directly to them, forming a number of vascular triangles with their apices at the efflorescence.

These triangles are very interesting and characteristic of the disease and are limited to a small part of the contiguous conjunctiva unless there are a considerable number of the nodules, in which case they become confluent and produce an injection of the entire ocular and even palpebral conjunctivæ. When the nodules form on the cornea the disease is known as phlyctenular keratitis.

The pathological conditions are similar to phlyctenular conjunctivitis. There is an accumulation of round cells under the anterior epithelium which first raises it up and then breaks down into grayish superficial ulcers. As the process in uncomplicated cases does not penetrate below Bowman's membrane, restoration takes place without producing opacities. Vascularization may or may not take place—not infrequently a ribbon-like process of vessels can be seen extending from the limbus of the cornea to the margin of the ulcer. Occasionally healing takes place only at the outer margin and the ulcer progresses centrally, pulling, as it were, the vascular band of vessels after it until nearly the entire diameter of the cornea has been involved.

The vast majority of these cases occurs among the poorer class of children, especially those subjected to poor food and bad hygienic surroundings. The large eye clinics of the city fairly swarm with these unfortunate afflicted children. Among the wealthier class the disease is more liable to be the result of a low state of metabolism, following the infectious diseases. Of late, some evidence has been offered to substantiate the claim that intumescent catarrh and nasal obstruction are important etiological factors. In fact, any disorder that tends to lower the vitality and nutrition of the child may be productive of this disease which must be treated constitutionally upon this basis.

The subjective symptoms are notoriously contradictory and variable. Frequently they are not at all in accord with the severity of the pathological process. Recently a young man consulted me, stating that some one had that morning called his attention to spots on his eye with some surrounding redness. Examination proved the spots to be two phlyctenulæ situated on the cornea. One was about the size of a pin's head, the other about six times as large. In spite of this fact he had performed his clerical duties in the bank all day without any inconvenience.

Usually there is much lacrymation and photophobia. In fact there is probably no other eye affection where sensitiveness to light may become so intense as in phlyctenular keratitis. The only comfort that many of these little patients take is that afforded by a dark room. Even in the dark some children cannot be induced to open their eyes and it becomes necessary to separate the lids with retractors. Examination at this time may reveal but one small superficial infiltrate on the cornea; perhaps no larger than the head of a pin, as the cause of all this irritation.

The prognosis in phlyctenular conjunctivitis is favorable. The disease is very amenable to treatment and generally terminates in a week or ten days without any serious results, although relapses frequently occur which torment the individual at intervals for years.

The prognosis in phlyctenular keartitis must be more guarded, not on account of the disease per se, but on account of the possibility of secondary infection. Here we have an excoriation of the anterior epithelium which is laid open to attack of the ever present pus organisms in the conjunctival sack, resulting in an infectious ulcer that may perforate the cornea, or at least leave permanent opacities in the substantia propria that will seriously interfere with vision.

The diagnosis is easy in phlyctenular conjunctivitis. The small elevations or depressions in the conjunctiva always near the cornea—the vascular triangles focusing at the lesions and the serous, rather than the flakey mucous discharge common in other forms of conjunctivitis all make up a picture that can be confounded with no other disease.

Phlyctenular keratitis is not always so easy. The point to be decided is whether or not we are dealing with a deep advancing infectious ulcer. Oblique illumination will demonstrate the superficial character of the lesions, and it will be noticed that it presents a rather uniform grayish aspect, differing markedly from the yellowish infiltrating appearance of the more virulent infectious ulcer.

The treatment of these diseases is local and constitutional—proper dietary and hygienic measures must be rigidly enforced. Each case must be treated according to the manifest indications present, but as a rule I think it will be found that the majority of cases respond best to phosphorous preferably given in the form of hypophosphites. The iodide of iron is also a favorite medicinal agent with ophthalmologists, but in my own experience does not compare with the former, in efficacy, especially in the old recurring cases and those following the infectious diseases.

Locally, in phlyctenular conjunctivitis a 2 per cent. yellow oxide of mercury ointment should be rubbed into the lesions by manipulation of the upper lid unless there is too much irritation, in which case it is best to begin with an impalpable powder of calomel followed in a day or two with the yellow oxide preparation. A good rule to follow in the use of the yellow oxide is one that was first formulated, I believe, by Professor Hotz, of Chicago, to the effect that if the eye feels comfortable a half hour or so after its use it will be desirable, otherwise disadvantageous. In phlyctenular keratitis the yellow oxide is of great service in those cases where there is a fasciculus or ribbon of vessels traversing the cornea to the lesion, but in those cases where vascularization is not present and irritation severe it is best to use a 1 per cent. atropine solution for a few days and then follow with mercurial ointment later when the symptoms are not so extreme. In very bad cases where the lesion shows a tendency to advance across the cornea followed by a band of vessels and healing peripherally, there is nothing better to check its progress than to touch its infiltrated margin with a 10 per cent. trichloracetic acid solution, followed immediately with a 1 per cent. sodium carbonate solution Smoked glasses are always necessary, and frequently a bandage is of great service.

In conclusion, I wish again to call attention to the remarkable disparity between the pathological indications and subjective symptoms found in phlyctenular keratitis. Why is it that in one case where the pathological manifestations are very slight the symptoms will be severe and in another where the pathological showings are extensive there will be hardly any subjective symptoms at all?

Histologically we know that naked axis cylinder processes extend from the substantia propria into the anterior epithelium of the cornea. Perhaps in some cases they are not so abundantly distributed. On the other hand there is a possibility that the bacilli or variety of bacilli causing this disease are variable in their virulency.

In one case their presence may be just sufficient to cause an infiltration and irritation of the nerve endings with marked symptoms, while in another case they may cause not only an infiltration, but temporary paralysis of the nerve endings with almost no subjective symptoms due to the virulency of their toxins.

This is a phase of the question that I have been unable to find discussed in the text books or literature upon phlyctenular keratitis. But the important point that I wish to offer is this—if such a condition that is so macroscopically evident in the eye can exist with such contradictory subjective symptoms, why can not these same variable symptoms frequently occur in other organs of the human anatomy, where they are not under the immediate scrutiny of the attending physician and thus defeat a diagnosis that is based upon the classical subjective symptoms that may never manifest themselves?

The explanation of such interesting questions in medicine depends to a great extent upon the original investigation of that class of modest, unremunerated, unappreciated workers in pathology and bacteriology who are doing so much to raise the standard of our profession to the height of a pure science.

ORIGIN OF TUBERCULOSIS IN CHILDREN.

By Robert W. Hynds, M.D., of Atlanta, Georgia.

The questions considered in the following paper have been so thoroughly discussed that it would seem to be useless to call attention to them again, yet the vital importance of the subject, and the fact that little organized effort has been made in Georgia to prevent infantile tuberculosis, I believe warrant me in presenting a brief review of some of its phases.

Tuberculosis in children is a more frequent occurrence than is commonly supposed. Cornet, Simons, Schwer and Bolz, in 2,447 autopsies in children under ten years of age, found tubercular lesions in 23.93 per cent.; Mueller, out of 426 autopsies, found tuberculosis in 23.36 per cent.; Jacobi, out of 1,045, found 14 per cent. tuberculous; Bollinger, out of 500 autopsies in children under fourteen, discovered tuberculous lesions in 218; Still, in 796 autopsies, found tuberculosis to be the cause of death in 32.8 per cent. Fisher says that one-third of the deaths in childhood are due to tuberculosis in one form or another. The disease is most frequent in children under four years of age. The bones, joints, and lymph glands are the parts most frequently affected. The mortality from infantile tuberculosis in the South is very high, owing to the large negro population; the majority of negroes dying under five years of age show tuberculous lesions. Botz, in 2.576 autopsies on children, found that 27.8 per cent. under one year of age died with tuberculosis.

The assertion of Fisher that it is a rarity to find primary intestinal tuberculosis in children is not susceptible of proof; in fact, the opposite is nearer the truth. Wegener found primary tuberculosis of the intestine and mesenteric glands in 12½ per cent. of 600 autopsies. Hoff found primary tuberculosis of the digestive tract in 16.6 per cent. of 15,000 autopsies, in which there was no involvement of the lungs. Raw states that it is rare to find phthisis pulmonalis as a primary affection under ten years of age. Branson, in a large series of autopsies in children, found that 20.9 per cent. died of abdominal tuberculosis. Price Jones' findings were 28.5 per cent.

The percentage of tuberculosis in children varies widely in different localities. Its great prevalence in children during the milk-drinking age, and the predominance of other types than the pulmonary seem to indicate a bovine origin. Out of three hundred cases of tabes mesenterica observed by Raw, not one was in a child fed entirely upon breast milk, but all of them wholly or in part had been given cow's milk. In communities where the milk was fed boiled or pasteurized the percentage of intestinal tuberculosis is less than in those where it is fed raw. Helle cites an instance of this in the greater prevalence of tuberculosis around Keil than in Berlin.

The sweeping assertion of Koch that human and bovine tuberculosis were so different in their nature that infection of human origin could not be transmitted to cattle, and that man had small reason to fear infection from cattle, was so contrary to the conclusions of many experimenters that opposition was immediately aroused and investigation of the subject taken up with renewed activity.

The theory of Klencke, in the early forties, and of Villeman, in 1865, as to the unity of human tuberculosis and that in the lower animals, was strengthened in 1868 by the demonstration of Claveay that cattle could be infected by tuberculous material from man. The work of Chaveau was substantiated in 1879 by Bollinger. The experiments of other investigators led to the same results, and the discovery of the bacillus tuberculosis by Koch in 1882 gave force to their conclusions.

Since the publication of Koch's paper in 1901 the investigation of the subject has been carried on by Nocard, Arloing, Fibiger and Jensen, Max Wolff, Hamilton and Young, Kossel, Theobald Smith, Ravenal, Behring and others, all of whom succeeded in transmitting human tuberculosis to cattle. This phase of the question is capable of direct experimental proof. Out of nineteen calves inoculated by Hamilton and Young with tuberculous material from man, fifteen developed the disease. The Imperial sanitary office of Germany reported the inoculation of sixteen calves, of which number four developed tuberculosis. Many successful results have also been obtained in this country in the Bureau of Animal Industry by Mohler and De Schweinitz.

Fibiger, in a review of the work that had been done on this phase of the subject, reported sixty-one attempts at inoculating cattle with human tubercle bacilli. Forty-one of these were successful. Out of eighty-one animals experimented on a positive result was obtained in fifty-one. His own extensive experiments were confirmatory of the results obtained by others.

The transmissibility of bovine tuberculosis to man cannot be established by direct experimentation, but a sufficient number of cases of accidental inoculation have taken place to prove this beyond a doubt. Ravenal reports four cases occurring in the laboratory of the State Live Stock Sanitary Board of Pennsylvania, and as to infection from the intestine, we have nearly two score instances reported by such reliable observers as Stand, Gosse, Von Ruck, Ollivier, Law, Ebers, Bang, and Rivel. In addition to the above, the post-mortem evidence is admissible on this point. Theobald Smith first pronounced a case of intestinal tuberculosis in a child to have been produced by the bovine type of bacilli. De Schweinitz reported two cases, Fibiger and Jensen three, and the Imperial sanitary office of Germany several cases.

Tscherming, Pfeiffer and Law each reported cases of veterinary surgeons who were inoculated directly from tuberculous cows. Gosse, Demine and Bouardel reported numerous cases of children who were undoubtedly infected by drinking milk from tuberculous cows. Lassar described several cases of persons who came in contact with tuberculous cows, contracting superficial tubercular lesions.

The British Commission appointed to investigate human and animal tuberculosis found, after a careful investigation, that the tuberculosis produced in cattle by material from human and bovine sources was identical in its general effect and in detail. Wolbach and Ernst, experimenting with tuberculins, came to the conclusion that there was no difference in the specificity between tuberculins made from human and bovine bacilli, and that there was no essential difference in the disease processes caused by bacilli from these sources. Not only has the communicability of tuberculosis between various species of mammals been demonstrated, but fish, frogs, and other cold-blooded animals have been infected with material from both human and bovine sources. Not all of the above attempts to inoculate an individual of one species with bacilli derived from another, or even between individuals of the same species have been successful, owing to the difference in the virulnce of bacilli derived from various sources and the wide variation in the resisting power of individuals and species.

The study of the difference in cultures of the tubercle bacilli of bovine and human origin has been exhaustively conducted by Theobald Smith. They differ in the appearance of the growth on culture media, the rapidity of growth, and in their staining characteristics, but most of all they differ in their virulence. The virulence of the tubercle bacilli of bovine origin is much greater than that of the human bacillus.

These differences would tend to throw some doubt on the transmissibility of the disease had it not been demonstrated that the morphology of the tubercle bacilli underwent marked changes with change in the culture media. If these could occur in cultures they would probably also occur if introduced into the bodies of animals of different species.

Pearson and Ravenal and Hamilton and Young succeeded in greatly increasing the virulence of human tubercle bacilli by successive passages through calves. Mohler succeeded in increasing the virulence of human bacilli for cattle by passing them through a series of rabbits. By passing tubercle bacilli through a series of cats he found that in addition to being more virulent their morphological appearance was also changed. Not only does the virulence of tubercle bacilli from different species show great variation, but the virulence of cultures from the same species is not constant. The German Tuberculosis Commission found four degrees of virulence in thirty-nine cultures from human sources. We may, therefore, consider it established that neither the morphological and cultural characteristics or the virulence of the tubercle bacillus are fixed, but depend largely upon their environment.

It is probable that bacilli of bovine origin when introduced into the human body in the course of time undergo metamorphosis and present a characteristic of human bacilli. In four cases of generalized tuberculosis in infants, De Schweinitz found two cultures identical with bovine bacilli. The constant introduction of bacilli of the bovine origin possessing a high degree of virulence into the human body is thought by Salmon to be the means of keeping up the disease in the human species, for the human organism seems to have the power of attenuating tubercle bacilli.

The part that the various routes of infection play in children is a subject on which there is a wide difference of opinion, and one not capable of exact determination. Raw believes that primary intestinal tuberculosis and tabes mesenterica are of bovine origin and are conveyed to milk. Osler considers the respiratory as a most frequent point of infection in infants. Woodhead believes that milk is the usual vehicle of infection in intestinal and mesenteric tuberculosis. Still thinks that tuberculosis of the intestine is often secondary and is caused by the swallowing of sputum. In 127 cases of tuberculosis in children he found tubercular ulceration of intestines in forty-three, and in one hundred cases the glands connected with the intestinal tract were tuberculous. Delipine states that the most frequent mode of infection is through the intestines. In England the general average of primary intestinal tuberculosis is about 25 per cent. In Germany, according to Heuppe, it is from 25 to 30 per cent.

The problem of determining the route of infection is one of great difficulty, owing to the fact that the location of the oldest lesion does not always indicate this. The lungs may be involved in cases which were infected by feeding and the intestine show no lesion. Dobronklonski first stated that bacilli could pass through an intact intestinal mucosa. Sidney Martin also established the occurrence of infection through mucous membrane without surface lesions. Nicholas and Dercas substantiated this statement, determining that the chyle collected from the thoracic duct of guinea pigs fed an emulsion of tubercle bacilli was fatal to dogs. Ravenal gave a single dose of tubercle bacilli through a stomach tube to dogs. The dogs were afterwards killed and tubercle bacilli found in the chyle and glands, and there was no intestinal lesion. The most favorable medium for infection is a fatty food, which condition is fulfilled by milk. The primary infection of the lungs is easily explained by the fact that the bacilli pass into the blood stream through the thoracic duct.

One of the most frequent channels of infection in children is through the tonsils. This mode of infection has been considered by Dieulafoy, Woodhead, Hamilton, and others. Hugh Walsham, in 34 post-mortem examinations, found the tonsils tuberculous in 20 cases. The route of infection seems to be as follows: Tonsils, cervical and mediastinal glands, thence to the thoracic duct, right side of heart and lungs. A frequent primary focus of tuberculosis in children is the bronchial glands. The lungs may be infected secondarily, directly from these, or the softened gland may ulcerate into trachea or bronchi, and the bacilli be drawn into the lungs. The tonsils are infected in several ways: The bacilli may be inhaled, they may be absorbed in some point in the pharynx, tonsils or esophagus, or they may be absorbed from the intestine and spread from the mesenteric gland upward.

Aufrecht believes that the lung tissue is never infected by the penetration of a mucous membrane of the respiratory tract, but that the main portal of entry is the mucous membrane of the digestive tract.

Behring argues against primary infection by way of the respiratory organs, and asserts that in order to have pulmonary tuberculosis follow infection with inspired tubercle bacilli it is necessary to have constitutional changes in the organism due to a previous infection. Behring states his conclusions as regards consumption in the following words: "The milk fed to infants is the chief cause of consumption." In experiments on guinea pigs he found that very young animals became tuberculous after a single feeding with the bacilli, and from this he concluded that the young of all mammals were very susceptible to infection through the intestine because of a lack of protective agencies in the alimentary system which are developed later in life. In this connection it might be well to mention the statement of Welch that one of the functions of the mother's milk was in transferring proper antibodies to the child, increasing the resisting power of the infant to infection. Behring investigated the intestinal mucous membrane of the young in order to discover why so little resistance was offered to the passage of bacteria. He found that the mucous membrane in infants possessed no continuous epithelial covering, and that the gland-tubes of the ferment-producing glands are little, if at all, developed. He states that although phthisis pulmonalis may not develop until adult life, the real beginning of the infection dates back to infancy when the disease germs were first introduced into the body. He does not state that milk is the only source of infection, but that the bacilli-laden particles of sputum scattered in coughing gain entrance to the nose and mouth of infants and from there reach the intestinal mucous membrane. His main conclusion is "that an infantile tuberculous infection predisposes to pulmonary consumption."

The old assertion that the lungs are the primary seat of tuberculosis in man, the infection being conveyed by inhalation is not susceptible of proof, and is no more probable than the assertion of those who have gone to the other extreme and attributed tuberculosis mainly to the ingestion of infected food. In considering this question, we are at present wandering in the vague domain of theory, but it seems, in the light of our present knowledge, that the digestive tract is the most frequent route of infection, the two main ports of entry being the tonsils and the intestines. We have also underestimated the importance of glandular tuberculosis contracted in childhood to pulmonary tuberculosis contracted in later life. Baumgarten holds that the tubercle bacilli can remain latent in the tissue for a long period of time until, for some reason, the resistance is lowered and tuberculosis results. The cells of the lungs lending themselves most readily to influences of a trophic, tonic, or traumatic character become the seat of a secondary infection. The portions of the lungs which are first affected are much more readily entered by the bacilli through the blood stream than through the air current.

The evidence as to the communicability of bovine tuberculosis to infants is so conclusive that there is no longer any room for doubt. The only point in question is as to the comparative frequency of this mode of infection. This source of infection is much more frequent than has been generally supposed. Certainly we have underestimated the frequency of abdominal tuberculosis in children. It is our duty to guard against tuberculosis infection in every way possible, and to insist on milk absolutely free from tubercle bacilli for infant feeding. The cows should be tested with tuberculin, and those which react positively should be separated from the herd. The statement that only milk from cows suffering from tuberculosis of the udder is infected, according to the investigations of Mohler, is incorrect. Twelve out of 56 cows examined by him which showed no sign of tuberculosis of the udder gave milk containing tubercle bacilli.

It is to be hoped that the immunizing procedure of Behring, that is, the prevention of tuberculosis in cattle by the inoculation of a protective virus which is now being extensively tried in Europe, will prove a success, and we can remove this source of infection. Tuberculosis amongst the negro children of the South can be diminished to a large extent by improving the sanitary conditions of their surroundings.

ON CONVULSIONS IN EARLY INFANCY.

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Infantile convulsions are, perhaps, the most typical of all the nervous derangements of early childhood. The mere fact, that they so often indicate a purely functional derangement of the nervous system, is characteristic; for it is a truism that in sick babies, functional are commoner than organic diseases, and symptoms bulk more largely than physical signs. That convulsions are characterized mainly by spasmodic movements, makes them further representative of the diseases of early life. The main function of the young infant's brain is the regulation of his movements; its derangements, therefore, are apt to take the form of motor rather than sensory neurosis.

CAUSATION OF CONVULSIONS.

Like all nervous disorders, which consist in disturbance of function, convulsions have often a multiple causation. That is to say, in order to explain their onset, we must often take into account, not only a combination of several exciting causes, but also a number of predisposing conditions. This point is of some practical importance, because we may sometimes succeed in stopping the recurrence of the convulsions, by curing one or more of the causes, even although the others are quite beyond our treatment. The division into predisposing and exciting causes is convenient, although it must be admitted that it is not always easy to draw the line clearly between the two classes.

Of *predisposing causes* four may be mentioned:—There is, of course, the *age* of the patient—the state of development of the infant's nervous system predisposing him to all kinds of convulsive attacks. (2) Certain general diseases may predispose—especially *rickets.* This is by far the most important of the predisposing causes, as it is the only one which is amenable to immediate treatment. The tendency to convulsions, in rickety children, rapidly disappears under antirachitic treatment, even although obvious sources of peripheral irritation persist. (3) A very important predisposing element is an *inherited nervousness* of constitution. Some children are hereditarily so nervous, that any rise of temperature or any peripheral irritation, however slight, may bring on a fit. This state of nervousness may be found in children who seem otherwise strong; and sometimes many members of a family have it to a marked extent. (4) Another predisposing condition is a permanently *damaged state of the brain* from any cause—quite apart from any recent changes in it. An area of cortical sclerosis, for example, even when it does not, apparently, affect the mental functions, is very often accompanied by a tendency to convulsions. In the same way, nearly all the developmental, and other lesions, which produce imbecility, predispose also to convulsions on slight provocation. The recurrence of convulsions in very young children should, therefore, always lead to a careful investigation of the child's mental state.

Possible *exciting causes* are very numerous indeed. The most important of them may be classed in one or other of three groups. (1) They may result from a number of *intracranial* causes (diseases, injuries or circulatory changes). Such, for example, are concussion, hemorrhage, tumor, abscess, and meningitis of all kinds, also the cerebral congestion, which we sometimes get in whooping-cough, and in some cases of congenital heart disease, and the cerebral anemia, which accompanies severe diarrhea and loss of blood. (2) *General acute morbid conditions,* again, are often responsible for a convulsive attack. A sudden rise of temperature, such as would produce a rigor in an adult, will often in an infant cause a convulsion. This is seen in pneumonia, and in various of the exanthemata, especially in scarlet fever. In uremia, fits are not uncommon, and a large number of poisons, both metallic and vegetable, often occasion them. (3) *Peripheral nervous irritation* is certainly a common exciting cause of fits, and one which is often present even when its site of origin is obscure. Undigested matters in the bowel or stomach, painful lesions in connection with dentition, otitis or phimosis may readily start a convulsion in rickety or neurotic infants. Generally, as mentioned above, the place of rigors is taken in young children by convulsions. It is, however, a very curious thing that acute irritation of the renal pelves frequently gives rise to rigors, even in very young babies. Among twelve cases of acute pyelitis from bacillus coli in infants, that I have seen, no fewer than six suffered from rigors. Two of the cases were in children of five and seven months respectively. In none of them had there been any ordinary convulsions.

SYMPTOMS AND DIAGNOSIS.

It is hardly necessary here to give a detailed account of a well-marked infantile convulsion, as its phenomena are just those of an ordinary epileptic seizure. It may be well, however, to say that there is the greatest difference in the severity of the attacks in different cases. In the worst, the tonic and clonic movements may be very severe, and the succeeding loss of consciousness profound and long-continued. In other cases, there may be just the slightest momentary unconsciousness, and no visible jerking at all. Slight and severe attacks often occur in the same child at different times.

There cannot usually be much difficulty in recognising a convulsion, if you see it. When, however, you have only the mother's description to go by, it may be impossible to be quite sure as to the nature of the "fit." Attacks of petit mal often pass unrecognized for months from the idea that they are merely slight faints. On the other hand, spasms of colic and laryngismus are not infrequently spoken of as fits. On two occasions, at least, I have seen cases of masturbation in female infants, who were being nursed tenderly, and were having bromides administered, under the impression that they were suffering from a variety of infantile convulsions.

EFFECT OF THE CONVULSIONS.

When mental defect is present after a series of convulsions, as is not seldom the case, it is generally probable that it existed before, and that it should be looked upon rather as a predisposing cause than as a result of the fits. Certainly, however, in some cases the intense cerebral congestion and excitement, accompanying the seizure, seriously injure the brain-tissue, either by causing hemorrhage or otherwise. The recurrence of convulsions is accordingly often followed by steadily increasing dementia, even in cases in which no naked-eye change is afterward discoverable. Occasionally, although rarely, the attack may be fatal. This, however, probably occurs most frequently in cases in which the fits are complicated by laryngismus. These considerations emphasize the importance of using active measures to stop the attacks as soon as possible. In other cases, also, temporary damage is done, and one or other cerebral function may remain in abeyance for some weeks, or months, after a severe convulsive attack. Thus, passing hemiplegia, or aphasia, or amaurosis may occur, due to temporary exhaustion produced in certain areas by the nerve-storm. Similarly, a condition of extreme intellectual dulness occasionally results, which is entirely and permanently recovered from, after it has lasted for many weeks.

DIAGNOSIS OF THE CAUSE.

Whenever the urgency of the symptoms has abated, the first thing that demands our attention is the discovery of the cause of the attack. In endeavoring to settle this question, we have to take various matters into consideration.

(1) There is to begin with, the patient's *age.* Should the attack come on within the first fortnight of life, the chance of its being due to a birth-injury is to be remembered. It is, however, certain that convulsions from dyspepsia and from other causes, quite apart from trauma, often begin very soon after birth. To this subject we shall return later. Those convulsions, which begin after the second week, are not likely to have anything to do with a birth-injury. They may rise from a defective brain, from dyspepsia and from various other causes. The great majority of fits, seen in normally developed babies between six months and two years, belong to the rickety class.

(2) The *character of the fit* often gives us but little help in the diagnosis; though, occasionally, it does shed some light on the question. If the features of the attack, *e.g.*, are those of petit mal, this generally, although not always, indicates a serious cerebral defect. If the fit is Jacksonian in character, this suggests a cortical lesion. If it is followed by prolonged unconsciousness, an organic cerebral cause becomes probable, although not certain. The fact of the movement being unilateral or asymmetri-

cal, does not necessarily, in young children, indicate a unilateral organic cause.

(3) The presence of *symptoms of any bodily disease,* that is known sometimes to cause fits, is, of course, of real importance, Thus, fever with rapid respiration, or a sore throat, may point to pneumonia or scarlet fever. A bulging fontanelle, head-retraction or paralysis, with a history of previous vomiting and headache, would suggest meningitis, whereas abdominal distension, malnutrition, &c., along with other dyspeptic symptoms, would naturally point to there being some connection with the alimentary canal.

TREATMENT OF THE ATTACK.

If the convulsion lasts long enough to allow time for treatment, it is generally advisable to begin by putting the child into a mustard pack or hot bath. It will be good for him, probably, and it will certainly soothe and relieve his alarmed relatives, who need something to do to take up their attention. To prepare the mustard pack, a towel is dipped into a quart of tepid water with which a tablespoonful of mustard has been thoroughly mixed. It is then swathed round the infant's body, covered with blankets, and left in position from ten to fifteen minutes.

If the convulsive movements continue for more than a few minutes, or if they go on recurring at short intervals, more active measures are called for, and some form of sedative should be given. Chloroform is one of the best to use, and its administration is quite safe and often successful. Chloral hydrate is also very effectual, and its influence lasts longer than that of chloroform. If the child cannot swallow, it may be given hypodermically (grs. 2-3) or introduced into the bowel through a rubber catheter. For rectal injection, 5 grs. may be given to a baby of six months, and 10 grs. to one of a year old. In severe cases, perhaps the most effectual treatment of all is the hypodermic injection of morphine. Of this, gr. 1/24 may be given to a well-grown baby of a year, and the dose may be repeated in half an hour, if no effect is produced. Morphine should not, however, be given to weakly or undergrown babies.

The chief question with regard to treatment in most cases of convulsions, however, is not so much how to deal with the attack, as how to prevent its recurrence. The answer depends largely on the type of case with which we have to do. We shall, I think, best deal with this, and also with other questions regarding prognosis, if we consider briefly a few of the commoner types of infantile convulsions.

COMMON TYPES OF CASES.

(1) *From birth-injury.*—If convulsions set in in a new-born baby, within the first week or so of life, it is only natural to suspect that they may be the result of some birth-injury. This suspicion is greatly strengthened, if the labor has been a difficult one (protracted, breech-presentation, or forceps), and if there was difficulty in getting the child to breathe after birth. If the fontanelle is tense and bulging, this is a very strong point in favor of a diagnosis of intracranial injury.

The treatment of such cases should be purely expectant. The infant is to be kept quiet and warm, and everything possible done to favor its nutrition. Sedatives are not usually called for.

The prognosis must always be very guarded. It is probable that many of tthe children, who have traumatic cerebral hemorrhages at birth, recover completely. It is, however, certain that a considerable number of those, who seem to get quite well, show symptoms of paralysis, or mental defect, in later childhood.

(2) *From Dyspepsia.*—In many infants who have convulsions, the attacks are clearly due to dyspepsia. Whether they arise reflexly from local irritation in the bowel, or are caused by some sort of auto-intoxication, need not be discussed here. In these cases, the fits may begin very soon after birth, or indeed at any time during infancy.

The main treatment consists in attention to the digestion, and especially in thorough regulation of the diet. The administration of modified and peptonized milk is often successful along with the judicious use of calomel, antacids, and stomach washing. Far the best treatment, however, consists in the employment, when possible, of a wet-nurse. Generally, no sedatives are required; but sometimes a few doses of chloral may be useful at first.

The prognosis depends on the progress of the dyspepsia. There is no likelihood that the brain will be seriously or permanently damaged.

(3) *"Idiopathic Convulsions."* The next group of cases may conveniently be called "idiopathic convulsions," because no organic or peripheral cause can be discovered to account for them. It may well be that these cases are really, after all, due to reflex irritation, or auto-intoxication, which remain unrecognized. The practical point to remember, however, is that such causes are not discoverable, and, therefore, cannot be treated, and that a purely symptomatic treatment of the convulsive tendency is often entirely successful.

The fits in these cases may begin as early as the first week, and generally appear within the first few months of life. The convulsions are not generally very severe or prolonged, and there may be only two or three of them in the day at first. They usually, however, increase in numbers, and there are often as many as 20, or even 40, in the day; and this may continue for weeks. It is, therefore, most important that the treatment should be prompt and thorough.

To temporise with moderate doses of bromide, or to try alterations of diet, when none are distinctly called for, is merely to lose time. What is necessary is to get the infant, as soon as possible, thoroughly under the influence of chloral; and, in these cases, this can be easily given by the mouth. In the youngest babies, gr. i. every two hours, and in children of one or two months, grs. i. to ii. is not too large a dose. The chloral should be continued, in these doses, until the fits have ceased for at least 24 or 36 hours, and then only gradually diminished in frequency. If the first dose given is not enough, the amount must be cautiously increased, until the baby is *almost* too drowsy to swallow. The greatest care must, however, be given to the feeding in these circumstances, as otherwise there is a considerable risk of an inhalation-pneumonia being set up. Usually we find that, after the chloral has been used for three or four days at most, the fits cease to return when it is stopped; and the child gets quite well. Occasionally there is a slight recurrence of the symptoms, but not often.

The prognosis is, therefore, generally favourable. It must, however, be guarded, because the babies are so feeble that intercurrent disease is to be feared; and also because it is hard to be quite sure that no organic lesion is being overlooked. I have recently seen two cases, in which convulsions, apparently of this type, ushered in a very early acute general tuberculosis. There seems to be no tendency for fits of this kind, even if very numerous, to cause permanent damage to the intellect. Sometimes, however, the baby remains quite drowsy and stupid for weeks after they have ceased.

(4) *From Rickets.*—The commonest kinds of convulsions, met with in a city practice in this country, are those which occur in rickety children about the age of teething. In these, the predisposing cause is all important; for if the rickets is energetically treated, the morbid sensitiveness to peripheral irritation rapidly ceases, and there are no more fits, even although no sedative drugs are given.

The age for this variety of convulsions is between six months and two years; and they are commoner during the spring months, when cold winds are blowing, than at any other time of year. The rickets is generally in an early and progressive stage. The diagnosis is made, by noting the presence of rickets, and the absence of signs of fever, or cerebral defect, or disease. It is strongly confirmed, if facial irritability (Chvostek's symptom), laryngismus, or tetany is, or has recently been, present.

Prompt treatment of the rickets leads, almost invariably, to most satisfactory results. The digestion has, of course, to be seen to, and the diet regulated, on strictly antirachitic lines. Cod-liver oil, with or without phosphorus, should be given. It is of great importance to see that the child has plenty of fresh air. It is well also to institute a regular cold douche once or twice a day; this has a powerfully soothing effect. Under such a regime, the baby's health usually improves rapidly, and the convulsions cease almost at once. Should they be very numerous, however, or very severe, it may be well, during the first day or two, to give a few doses of antipyrin (grs. i.-ii., according to age and size).

(5) *From Cerebral Defect.*—In many cases the occurence of convulsions in an infant is the first, and it may be, as yet, the only sign of idiocy. Generally, the siezures, in these circumstances, take the form of petit mal to begin with. The baby is seen, from time to time, to give a sudden jerk forwards of his head and shoulders. After this, he may be unconscious for a minute or so, with heavy breathing, and he often cries bitterly. As he gets old-

er his "turns" become more obviously epileptiform in character, and usually develop into ordinary convulsions.

The occurrence of such attacks is a very bad omen for the child's future. They tell of a serious defect of the brain, and their frequent recurrence is always followed by further mental deterioration. The character of the fits, and the usual signs of mental backwardness, soon render the diagnosis easy.

The results of treatment are apt to be most disappointing. Sedatives have only a slight and temporary effect. If they are pushed, they upset the digestion, and do more harm than good. Frequent changes to the country, and at times the administration of iron, or some other tonic, form generally the best treatment. In a few cases, the administration of thyroid does good for a time.

ARE CURDS IN INFANTS' STOOLS EVER CAUSED BY INSUFFICIENT PROTEIDS?*

By Palmer A. Potter B.S., M.D.,

There are certain set rules laid down by which certain appearances of infants' stools are supposed to indicate an excess or insufficiency of certain constituents in the diet. For example, a bubbly, frothy movement is supposed to indicate an excess of starch. This is often substantiated by the prompt reaction of the "iodine test." In the same way green stools are usually due to one of the following causes—exposure to the air, in which case the outside only is green, the inside presenting the normal color—to intestinal fermentation—due, according to Wegscheider, to biliverdin taking the place of bilirubin as the coloring matter—to insufficient food and consequent lack of residue to dilute the bile—stools green from this cause are usually bright green and without much substance—to malted foods, these being slightly brownish and sometimes having the odor of malt—and to a diet of barley water, in which case the green is due not only to the barley but also to the undiluted bile.

The presence of curds shows a lack of digestion, and presumably an excess of either fats or proteids. The proteid or casein curds differ from the fat in that they are usually whiter, harder, often, but not always, larger, and are insoluble in alcohol and ether.

It may be taken for granted that the proved presence in the stools of casein curds means that the proteids are not all digested. But the reason for their not being digested is not necessarily due to their excess in the food, but occasionally to their insufficiency.

The possibility of this apparently anomalous condition first presented itself to me in August, 1902, while examining the breast milk of a nursing mother. Her baby, five months old and weighing 13 pounds and 4 ounces, was having recurrent disturbances of the bowels, and in the movements were numerous large, white and typically casein curds. In accordance with the general impression regarding the gradually increasing strength of mother's milk, the clinical conclusion —as the baby was five months old—would be that the proteids were too high to be digested. This view was certainly borne out by the curds in the movements. They were not fat curds, and neither were they that phenomenon, occasionally seen in the stools of breast babies, the milk granules of Ufflmann, as in addition to being white, hard and shiny, they were insoluble in alcohol and ether. The mother's milk, however, the only food the baby was taking, showed only about half per cent. (½%) proteid. The chance of improving the quality of mother's milk by appropriate diet when the proteids are as low as this is practically nothing, so the baby was given a dose of castor oil and put on whey for gradual weaning. The curds still persisted in great quantity and the baby had, incidentally, about six movements a day, although whey has less than one per cent. of proteid, and most of that in the extremely digestible form of lactalbumen. When enough milk had been added to make the combined proteids almost 2 per cent., the curds, which were repeatedly examined and found persistently casein, had gradually disappeared.

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* Read before the 139th annual meeting of the Medical Society of New Jersey.

Two facts are to be noted in this case. The first is the low amount of proteid material in the milk well along in lactation. This runs counter to the general impression that mothers' milk gradually increases in strength. This general impression, however, seems to be absolutely erroneous and not based on facts, as recent analyses of the milk of 400 nursing mothers show almost without exception the highest amount of proteid by the end of the first week, gradually decreasing until at the eighth month of lactation it averaged only one per cent.

This fact alone shows the irrationality of attempting to imitate chronologically mothers' milk by modified cows' milk. Consistently to do this the baby would be fed a stronger formula at the end of the first week than at any subsequent time.

The second fact is the persistent presence in the stools of casein curds with a low amount of proteid, and their disappearance with an increased strength of milk.

A daily examination of the stools of many bottle babies showed this condition in but five cases.. I mean by this condition not merely the presence of casein curds, but their presence when the baby was taking a low percentage of proteid, the curds being due apparently to this low amount of proteid, and this supposition being borne out by their disappearance under a higher formula.

Two of these cases I mentioned in detail in the Medical News of January 9, 1904, in an article on "The Relation of Proteids to Edema," but no stress at the time was laid on the presence of curds, but merely on the disappearance of the edema under increased proteids. The five cases presented subsequently the same clinical histories, and need not be taken up in detail. The babies were all bottle-fed, the formulæ were low, the curds were known to be casein by their insolubility in alcohol and ether, and disappeared by increasing the amount of proteid.

The possibility of deficient proteid causing bowel disturbances, to be cured only by increasing the proteids, was pointed out by Adriance in the Archives of Pediatrics, August, 1903. I wish, however, to emphasize the fact that not only diarrhea, but actual curds, in themselves apparently an evidence of undigested proteids, may be due to the insufficiency of proteids in the diet. This condition is seemingly so illogical that, at the request of a well-known pediatrician, I have changed the title of this article from the dogmatic statement that insufficient proteids do cause curds into an inquiry whether such a thing is possible.

At the time the case cited first attracted my attention I asked two men connected with pediatric institutions to look for cases of the kind and to collaborate with me in publishing the results. They said the condition was unthinkable and impossible; that they had ever noticed it and never expected to. At that time I had seen but the one example. Since then I have seen five others.. I know the conditions is not only thinkable, but possible.

Physiologically and chemically it does seem preposterous. Curds insoluble in ether are undoubtedly proteids that the baby cannot take care of and digest. How, then, by feeding more proteids can we increase the capacity of the child to take care of additional food? Why is not the only result of more proteids by mouth an increase in the number of curds, the intestine taking care merely of the same or even a less amount, because of being overloaded?

A possible explanation of this and similar apparently abnormal conditions may be due to the fact that low proteids and a fixed amount of hydrochloric acid give an excess of uncombined or free acid. More proteids and the same amount of acid will result in less free acid. Hammerstein, in "Jahrsbericht über den Fortschritte der Thier Chemie" states that casein with a dilute acid forms a loose precipitate, which dissolves completely in sodium chloride solution. But with an excess of acid, hydrochloric or any other, such as is present with insufficient food, a precipitate is formed that is insoluble.

These statements are apparently fully borne out by experiments at the New York State Agricultural Station. Van Slyke and Hart, in Bulletin No. 261, state that "where the calcium casein of cows' milk is treated with an acid it results in the formation of base-free casein—soluble in warm 5 per cent. solution of sodium chloride and in hot 50 per cent. alcohol—which also posseses the property, when warmed, of being very plastic and capable of being drawn out into long, fine, silky threads." But "when this base-free casein is treated with ——— acid the properties of the casein are changed, so that it is no longer soluble in 5 per cent. solution, and in addition has lost entirely its plastic properties and the power of being drawn out into fine threads." In other words, it is indigestible when treated with an excess of acid, a result which would be obtained in the stomach by the lack of sufficient proteid to combine with the normal amount of acid present.

Another possible explanation that might be suggested is based on the statement of Walkowitsch, quoted by Pawlow, that a large fat content in milk inhibits the secretory function of the glandular process. When large quantities of fat are introduced into the stomach they impede the digestion of proteid substances. If with a greater amount of proteid the same total, but a relatively smaller, amount of fat is given, digestion of the proteid material would apparently be more successfully accomplished, accounting for the disappearance of the curds in the movements.

The exact converse of the preceding condition is seen—or at least recognized—much more frequently. Two classes of cases need only be mentioned to illustrate the evident fact that a child might be taking too much proteid—too much temporarily, at least—and yet show absolutely no curds. Marantic children, especially those under four months of age, will often be taking too high a formula and yet have normal movements. That the food is too rich for their assimilative powers, but not for their digestion, is shown by the fact that with normal movements and no curds they do not gain or even lose continuously, and that the higher the formula, the greater the loss in weight.

In the second place, bottle-fed babies on a high formula, who are being weighed daily and gaining steadily, will occasionally cease to gain for a period of five or six days. This cessation of a previously steady increase in weight is due to a sudden inability of the intestines, from some unknown cause, to take care of the rich food previously digested, although the movements remain normal, with no curds. If the formula is not lowered this condition is often the precursor of an acute intestinal disturbance. The inability to take care of the food is shown first only by lack of gain, then usually by loss of weight, followed later by the clinical evidences of bowel disturbance.

These illustrations of fairly common cases show that a child may be taking altogether too high fats and proteids for its assimilative or digestive powers, and yet have absolutely normal movements and no curds.

The important deduction to be made, it seems to me, is not merely that insufficient proteids may cause curds, or that a baby may be taking too high proteids or fats and yet have no curds, but that no baby can be fed by rule, and no dogma for modifying the food can be laid down as suiting all cases, or indeed, most cases.

A CLINICAL STUDY OF CHOREA.*

By August Adrian Strasser, of Arlington, N. J.

As alarming as the symptoms attendant upon chorea are, we are justified usually in giving a cheerful prognosis. Occurring mostly in females of school age, one of the greatest predisposing factors stands out boldly, namely, overwork of body and brain. Given an anemic state, a rheumatic tendency and superimpose the always useless work of examinations and the preparations for them, and it is not difficult to see how a nervous system under that strain will lose its equilibrium. Restless nights, night-terrors, purposeless movements by day, a peculiar twitching of the risorii are the danger signals which tell us to apply the brakes and stop short for a while to let the system repair the overstrain..

It is not difficult to recognize chorea clinically. A child is brought to us because, despite of scolding and even corporal punishment, it will persist in meaningless movements. A grin before it speaks; fantastic twistings of the fingers, and perhaps the spilling of contents of the spoon that was being raised to the mouth are made; or standing still is an impossibility; the one foot will stamp or swing about, and the more so if attention is called to it and the patient attempts to inhibit it. The child appears fairly well-nourished, but the mucous membranes are pale; hemoglobin is down to 50 or 60 per cent. Restlessness, snoring, due to adenoids, perhaps, is remarked; constipation may or may not be of moment; tongue is furred. The eyes are not steady and the handwriting grows more and more illegible. As hard a student as a child may have been, it complains now of the distinct effort to fix attention, and when asked to explain it, says that these movements are embarrassing. Inspection shows that musculature is not firm, and as the disease progresses, if one side is involved more than the other there is a distinct shrinkage; this, strangely enough, is hemmed by regular massage, a therapeutic indication least essential, apparently, in overworked muscular tissue. But the rationale is found in the fact that chorea is essentially a nervous affection, and general therapeutics act best on lesions of such tissues. The anemia is marked and progressive, so that at the height of the choreic attack it is possible to record clinically a hemoglobin estimation of 20 per cent. It is at this stage that we find frequently the typical hemic murmurs; it is later usually that valvular lesions are discernible.

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*Read by title before the 139th annual meeting of the Medical Society of New Jersey.

Whether there is a hemichorea or one involving both sides of the body, there is a fine fibrillary twitching in the muscles of both sides; close observation will find these in addition to the regular choreic movements. They persist longest in the tongue; this organ when protruded but slightly shows them, even if the choreic movements have entirely disappeared from the limb or trunk vessels; but if on command the tongue is protruded as far as possible, both the fine and the coarse movements are elicited and the pillars of the fauces may share them. In one case the laryngeal muscles participated, and at times a strange clucking or crowing sound was emitted entirely beyond the patient's control.

Luckily it is only in the most aggravated cases that sleep is invaded; usually rest is complete, and falling to sleep does away with the movements. Speech is interfered with and is of a jerky character, unpleasant to the patient and causing her to forego conversation of any kind. Pains are not, as a rule, complained of, but occasionally headaches and backaches, the latter especially in the vertebral signs or in one particular vertebra (Rousse), may be severe. The urine is unchanged, except that urates and phosphates are in excess. There is no muscular exhaustion, explained by the fact that it is not the same, but varying, groups of muscles that are drawn into activity.

Upon examination, it is almost always feasible to elicit Gordon's phenomenon, and according to Eshner (Phila. Med Journal, June 8, 1901), this may serve to differentiate chorea from the other two maladies likely to be confounded with it, the spasmodic tic and the athetoid movements in cerebral lesions. In the former the knee-jerk elicited is unchanged from the normal; in athetosis the knee-jerk is much exaggerated. In chorea the knee reflex may be described as variable and Gordon's phenomenon in various modifications can be provoked. With the patient recumbent, the response to a tap on the ligamentum patallæ is seemingly normal, but as the leg falls back there is an apparent afterthought and extension is hesitatingly completed a second time before the muscles relax. I was able to get this in three-fourths of my cases.

Except in very severe and fatal cases, mental disturbances are not usual, although hysterical attacks and hallucinations of sight are occasionally found. In fatal cases hyperpyrexia and delirium precede the collapse. Thus in the case of Westphal, Wassermann and Malkoff detailed below.

The heart condition should always receive close scrutiny. Altered rhythm, tachycardia, perhaps precordial pain, antecedent, simultaneous or postchoreic endocarditis, are all to be kept in mind. Osler in a large series found 53 3-7 per cent. cardiopathies after chorea. Of course, closely linked to this question is the endocarditis following acute rheumatism or infectious diseases. For instance, T. Fröhlich (Norsk Magazin f. Laegevidenskaben, September, 1900), reports 47 cases of chorea ranging in age from the third to the sixteenth year; 15 had acute rheumatism; 16 had some angina, arthritis or erythema nodosum, showing them to be infectious; 12 had had no previous infection, but of these 3 had cardiac lesions, thus proving an infection of 80.85 per cent.

So also Ausset and Vincent (L'Echo med. du Nord, Vol. 5, No. 14), reports an instructive case in a child eleven years old who successively passed through acute articular rheumatism complicated by an endopericarditis, pleurisy, pulmonary congestion, cerebral rheumatism and hemichorea.

In a disease where so much of the etiology is still *sub judice* no one factor must be left out of account. It is a fact that females are more liable to contract the disease, in the proportion usually of two to one. It is essentially a disease of childhood, the ages of five to sixteen being most frequently affected. Hereditary influences are irrefutable and usually, as Leroux (1898) and Kraft Ebing (1900) have shown, it is a transmission to a child from a mother subject to hysteria, epilepsy, psychosis, alcoholism or the rheumatic diathesis. Violent emotions (Brush, Cook, Fischl) may cause chorea in some predisposed individuals, and so, no doubt, can any of the acute infections be causative of a typical minor chorea. G. Köster (Müench. Med. Wochenschr., August 12, 1902), gives statistics of 121 cases of chorea, 86 of which were in combination with some infection.

Personally, the etiology of the disease has been found to be based on that clinical entity—a rheumatic diathesis. By that I mean this: The cases usually have a family history in which figures articular rheumatism, valvular cardiac disease, perhaps chorea in the mother in her childhood or during gestation, repeated hypetismus, or other dermatological eruptions, arthritis deformans or ultimately various cases of tuberculosis in one form or another.

In one case all the factors mentioned above found vent. The patient, an anemic girl of thirteen, at puberty, in addition to school work and such share of the housework as fell to her lot in a large family of brothers and sisters, prepared for confirmation, and naturally, tired Nature expressed her disapprovel by an attack of severe chorea. The family history is interesting. Paternal grandmother is living, but tuberculous; the father, a mason, has unmistakable arthritis deformans, involving hands and feet; the mother had chorea badly as a girl, with great anemia (chlorosis); one—the eldest—sister also had had an attack of minor chorea four or five years ago while under my care; and the most interesting case of all, her next older sister has a true cor bovinum, with mitral and aortic stenosis and regurgitation, subsequent to neglected or improperly treated acute articular rheumatism. A younger child of the family has had an obstinate eczema that finally yielded to antilithic treatment.

So, too, Hohlfeld (Berlin, Klin. Wochenschr., No. 31, 1903), suggests that erythema exudativum multiforme, chorea, rheumatismus nodosus and endopericarditis may possibly all have a single origin, and that their frequent combination is not a mere coincidence. He also calls attention to the occurrence of various members of the group in different members of the same family.

There is no doubt that these are all exhibitions of the same underlying diathesis, brought out by poor and insufficient food, crowded quarters and unhygienic surroundings.

But, of course, the exciting causes are the matters of real interest, and here we strike immediately into a sea of uncertainty and controversy. "Meyer (1894), Duckworth (1896), Marfan (1897), Kraft-Ebing and Huebner (1902) are earnest adherents of the doctrine of interrelation of chorea, rheumatism and endocardial affections, while Osler, Leroux, Gilles de la Tourette and Fischl combat this view and look upon such an interrelation, if it exists, as not at all a binding one. Daddi and Silvestrini, Litten and Fröhlich report chorea following a gonorrheal endocarditis." (Fischl in Biedert's Lehrb. d. Kinderkr.)

Whether or no chorea itself is caused by an infection of some sort is by no means a settled question. As Osler puts it, "The disease is usually considered as a neurosis, but the clinical characters of the severe cases and the frequent heart and joint complications have suggested to many recent writers that it may be due to a specific poison." Leredde discovered in one patient's blood the staphylococcus pyogenes albus, which after the cure of chorea disappeared. Pianese isolated during life and post-mortem a germ whose culture was possible and inocculation with which upon lower animals produced choreiform movements. Triboulet found pyogenic streptococci and staphylococci, Dana diplococci, in the cerebral cortex; also H. Meyer and Steinkopf, although Leroux had negative results. Appert isolated from the blood of choreic patients the same microbes which he had before found in acute articular rheumatism; while F. J. Poynton, with Dr. Paine, produced choreiform movements in a rabbit by intravenous inoculation of the diplococcus which they have isolated in cases of acute rheumatism. Subsequent investigation showed that the diplococci were present in the pia mater and in the endothelial cells of the blood capillaries dipping down into the motor cortex. Under these circumstances, as Still says, "The difficulty of complete microscopic examination of so large an organ as the brain makes a negative observation of little value, and, as Mircoli has pointed out, there are many fallacies which make it so easy to overlook bacteria in the brain that, in face of such positive evidence as already exists, it would be hard to disprove the infective theory of chorea." Mircoli (Berlin, Klin. Wochenschr., 1900, No. 14, p. 303), in 17 cases of rheumatic chorea found pyogenic cocci in the joints of 14, staphylococci preponderating, while the remainder exhibited the diplococcus lanceolatus, and Westphal, Wassermann and Malkoff (Berlin, Klin. Wochenschr., 1899, No. 29), support the infectious theory of chorea, for, like Poynton and Pianese, they report a case of acute articular rheumatism, followed by chorea and complicated by endocarditis and nephritis, from which they succeeded in isolating from the blood, the brain and the endocardial vegetations a streptococcus capable of inducing with hyperpyrexia a poly arthritism in lower animals, from the exudate of which the same microorganism could be isolated, and after culture, upon reinoculation, produce arthritis again. It was a streptococcus, although in the blood and tissues it seemed a diplococcus. The conditions of growth require a higher degree of alkalinity and a larger quantity of peptone than in the usual media.

Lee (Brit. Med. Journal, August 29, 1903) adds testimony to the question by laying stress on the close relation of chorea and rheumatism being coincident or consequent in 60 per cent. of the cases, and concludes that on clinical and bacteriological evidence chorea is in a great majority of cases really, as Duckworth in 1896 first claimed, a cerebral rheumatism. It is possible, of course, that various microbes and toxins, and perhaps sudden emotional disturbances, may affect the cortical cells in a way similar to the alteration in nutrition caused by rheumatic toxins.

Taking all these positive facts into consideration, the stand taken in an editorial of the Medical Review, June 30, 1900, is not too far-fetched when it says: "From a number of considerations acute rheumatism is looked upon as a variety of pyemia, but without suppuration and chorea as a manifestation of the cerebral localization of the pathogenic agency." There is one very good case reported to bear out this view. Preobrazhensky (Medizinskoe Obozryeine, No. 21, 1903) reports a case in a girl, eighteen years of age, who had a violent minor chorea, attended by retention of urine, temporary paralysis, aphasia and mental disturbances. Arsenic, chloral and bromides failed to bring any relief. Blood examination revealed numerous streptococci, and from thirteen to fifteen injections of antistreptococcus serum were given, stopping the chorea and allowing the patient to recover. There was a slight relapse, but it was readily cured by the use of Fowler's solution. The author advocates blood examinations as a-routine practice in chorea, and if the the germs are discovered, the use of a polyvalent antistreptococcus serum.

EDITORIAL

INTESTINAL DISTURBANCES IN INFANTS.

In a recent issue of the *Berliner Klinische Wochenschufe* (Aug. 28, 1905) H. Salge, in discussing the intestinal disturbances of infants, divides them into those which may be due to the diet as such, and those which arise as a result of bacterial action.

Dyspepsia, he says, is produced by the ingestion of more food than the digestive processes can take care of, either too large feedings being given, or the interval between is far too short. Owing to this disproportion between the amount of food ingested, and the digestive powers, chemical changes take place in the contents of the alimentary canal which becomes pathological and irritates the mucous membrane, producing vomiting and diarrhea.

Besides the obvious prophylaxis of care in apportioning the food, the author advises for treatment of this dyspepsia, starvation for twenty-four hours on a weak infusion of Russian tea, sweetened with saccharin instead of sugar. If the symptoms do not yield to this treatment, calomel may be given in doses of 1/3 to 3/4 gr. at intervals of two hours for three times. Milk diet should not be resumed at once when the stomach and intestines are emptied but some starchy diet substituted. The author recommends Soxlet's nutrient sugar, a soluble preparation of malt and dextrin, to be used in 5 per cent. solution for very young infants. For older babies pure oatmeal or cornflour may be used. Within three days the stools should be semi-solid and of a dark brown color, when the milk may be cautiously resumed. If the vomiting and anorexia continue, the motor functions of the stomach should be investigated. The child should be given a meal adjusted to its weight and age, and the evacuation examined for undigested food and free hydrochloric acid. If the stomach is not empty and contains no free hydrochloric acid it should be washed out with a 1 per cent. solution of Carlsbad salts. In obstinate cases pepsin and HCl may be of use, or a mixture of 1 gram of liq. strychnini, 2 grams of fluid extract of condurango, and ten grams of tincture of rhubarb may be given in doses of five drops each, fifteen minutes before a feeding, three times a day.

Infantile enteric catarrh generally occurs as a sequel of the dyspepsia, with thin, watery stools, very acid, and speedily producing intertrigo. The bad results upon the general health are not slow in appearance, and wasting sets in. The respiration is deep, difficult and frequently sighing, the pulse irregular and small. Vigorous children often exhibit a high fever which may be lacking in those of weaker constitution. The great danger to life in this condition is in collapse, and the best means to combat such a tendency is the hypodermic injection of comphor in an initial dose of 0.1 to 0.2 gram, half the dose repeated at two hour intervals. A very little tea may be given by mouth, and the body supplied with water by subcutaneous injections of saline solution, 150 c. cm. twice a day. Cold wet packs may be employed to reduce the fever, and fats should be eliminated from the diet even after the tendency to collapse is overcome. The best food is mother's milk with the fat taken out. If this cannot be had, thin barley water or other similar starchy preparation may be used. The author reports some cases in which good results have been obtained by giving good full milk warmed to 40 degrees, C. and treated with pepsin, the amount of the latter, however, being double that usually indicated.

EPIDEMIC CEREBRO-SPINAL MENINGITIS.

Up to the present time the number of cases of this disease has lagged behind that reported for last year. What the factors have been that have caused this is not yet known, for it was reasonble to expect a far more extensive invasion this winter than last.

Nor are we out of the woods, for it may truly be said that winter has hardly begun, at least in our more populous cities. Of the 85 epidemics that have been recorded in the United States at least 35 have occurred in the winter, whereas 23 have been confined to the spring months, the remainder have occurred in winter and spring. Epidemics have occurred in the summer in other countries, but not as yet in the United States; and mild winters have not been entirely immune. This emphasizes the necessity that no false hopes of security should be indulged if any effective prophylaxis is to be maintained.

Foremost among the facts which repeated studies have emphasized is the overshadowing importance of the meningococcus of Weichselbaum as an etiological factor in the production of this disease. The more or less constant presence of the meningococcus in the nasal secretions is also to be borne in mind, and a third truth, confirmed by many reports, is that direct personal contact plays no uncertain role in the spread of the infection.

Thus cerebro-spinal meninitis emerges from the position of a hidden, mysterious disease to take its place with other well-known infectious diseases, and in order that its ravages may be curtailed its control by well-known hygienic procedures alone is necessary.

Early notification; strict isolation; disinfection of rooms and articles in contact with the sick; the exclusion from school of children in infected houses and bacteriological control of the nasal secretions—these are the necessary steps to be insisted upon if any progress is to be recorded.

The epidemic of 1904-1905 assumed almost an endemic character, so widespread were the infectious foci. We may hope for some improvement if the control of the more prevalent zymotic diseases is more closely heeded.

ABSTRACTS

Concerning Late Rickets.—HANS CURSCHMANN (Mitteilungen aus den Grenzgebeiten der Medizin und Chirurgie, XIV Bond, 3 Heft). The question as to whether late rickets can really be considered as a form of true rickets has been very much disputed. Many of the students of early rickets have denied its existence, while many surgeons have insisted that it really occurred. The writer reports the case of a young girl in whose family rickets had occurred but who had herself never had any of the signs of early rickets. About the fourteenth year she ceased to grow without any symptoms of disturbance of the bone. In the seventeenth year, within three months, there developed a marked change in the bony skeleton of the trunk and extremities, associated with pain and disturbance of locomotion. A rickety rosary developed, as did a typical rachitic flat pelvis, with a marked enlargement of the epiphyses of the upper and lower extremity, together with more or less marked bending of the long bones. There was no disturbance of the bones of the skull or of the teeth. There was only a slight dorsal scoliosis. Under treatment, which consisted of rest in bed, phosphorous and salt baths, the process was arrested within about three months and some of the disturbance receded somewhat. The writer believes that the most important question in the differential diagnosis of this case is as to whether it may have been a case of osteomalacia. He points out, however, that practically all of the important features of this case are not the features of osteomalacia, but are the features of rickets. The radiographs seemed to confirm this latter view. As to the etiology of the condition practically nothing is known as only comparatively few cases have been reported. Over exertion, which some of the writers have assumed, may determine the localization of the process, but does not explain the etiology. As to the age, it usually occurs about the time of puberty—in most of the cases reported, from the fifteenth to the twentieth year, in a few, from the ninth to the twelfth year. The question as to whether the late rickets may not be a recurrence of early rickets can be excluded in most of the cases reported. The especial predisposition of puberty to the development of late rickets can be explained upon the basis of the more rapid growth and the increase of ossification at this time in a fashion quite analogous to that which occurs during the infantile period of development. The symptomatology is rather characteristic. The first subjective and objective symptoms appear in the legs, and are characterized by stiffness, with pains in the muscles and about the joints. The gait at first may suggest that of hip joint disease. Enlargement of the epiphyses and bending of the shaft of the long bones soon develop. The arch of the foot becomes flattened. These symptoms do not develop symmetrically, but appear to be more marked in one leg than in the other. The muscles present the condition of hypertonicity. The patient frequently shows a diminution in height. Changes in the spine are very slight, and if present are usually confined to scoliosis. The changes in the pelvis are quite characteristic and present the features of the usual flat pelvis of rickets. The thorax presents little or no deformity, aside from the rachitic rosary. The skull and the teeth show practically no change. The other disturbances associated with early rickets are practically never seen in late rickets. The treatment consists of rest in bed for some weeks or months, phosphorous, salt baths, and good food. Mikulicz has called attention to the fact that the so-called idiopathic genu valgum adolescentium is usually of a rachitic character and is only a part of a late rickets.

Myelocytes in the Blood of Infants.—ZELENSKI and CYBULSKI (Rev. Med. de la Suisse Rom. Genève, 1904, July) examined the blood in a number of cases, using Ehrlich's triacid stain. They found myelocytes in from 1 to 17 per cent. in eight cases of pernicious anemia in infants. In six cases of prematurely born infants they were present in great numbers. They were also found in some cases of hereditary syphilis, and a few times in severe cases of rickets, and in scrofula and in phthisis. They conclude the myelocytes are present in the blood in all cases of chronic disease in infants, the number depending chiefly upon the age of the infants, being greater the younger they are up to two months

Complications and Sequels of Laryngeal Diphtheria.—ROYER (American Medicine, Oct. 28, 1905) discusses the complications immediately following intubation, or attempts to intubate, when, from reflex apnea, cardiac or respiratory disturbances occur, of such gravity as to compel one to modify the procedure, or of such serious type as to cause the death of the patient. Royer states that atony of the cricoarytenoidei postici muscles may be a cause of acute stenosis after extubation. He also emphasizes the fact that reflex apnea causes dangerous disturbances. Atony of the abductors causes a tube to be returned in many instances. Pressure paralysis and exhaustion of adductors frequently cause autoextubation. Retained tubes are also caused by pathologic changes in the soft structure of the larynx and trachea. Such changes are often hypertrophic in character, following traumatism from the tube or loss of tissue from disease. There may be new cartilage formation in the perichondrium narrowing the lumen of the larynx, thus making a distinct pathologic change. For reflex apnea but little can be done. The courses of treatment open for the other conditions are: (1) Persist with intubation; (2) insert large tubes, allowing them to remain for long intervals of time; (3) when autoextubation becomes dangerous and large tubes are not retained, do tracheotomy; (4) intubate frequently while wearing the tracheotomy tube in order to prevent stricture stenosis; (5) with chronic stenosis due to contracting scar tissue, practice wide dilation with persistent intubation; (6) consider Roentgen-ray treatment as a possible adjunct in softening scars causing chronic stenosis; and (7) avoid, if possible, tracheotomy as a means of curing a patient of a tube habit.

A Note on the Condition of the Tendo Achillis Jerk in Diphtheria.—Dr. J. D. Rolleston (Brain, Spring, 1905) presents the results of his observations in 100 cases of diphtheria in which the tendo Achillis was investigated until the time that the patient was allowed to sit up. This period varied in length according to the severity of the case, the condition of the heart and the presence or absence of any paralysis from twenty to sixty-three days from the onset of the disease. The reflex was sought for in the recumbent position. In forty-seven cases the Achillis jerks were affected to a varying degree; they were completely lost in twenty cases, and rendered sluggish in twenty-seven. In the remaining fifty-three cases they remained active throughout the period of observation, which in no case was less than six weeks, and in several cases was prolonged to three months or more. The following are his conclusions: (1) The tendo Achillis jerks are affected in a considerable proportion of all cases of diphtheria, though less frequently than the knee-jerks. (2) The frequency and extent to which they are affected bear, like albuminuria and paralysis, a direct relation to the character of the initial faucial attack. (3) They are completely abolished in all cases of diphtheritic paraplegia. (4) Their absence may be the only evidence of loss of motor power in the lower limbs. (5) Like the knee-jerks, they are liable to be affected at an early stage of the disease, and to remain absent after disappearance of all diphtheria paralysis, properly so-called. (6) Like the knee-jerks, again, they may be unequally affected on the two sides; and, like the former, they may be unusually brisk before they become sluggish and finally disappear. (7) The Achillis jerk, like the knee-jerk, after it has been lost may reappear on one side before it does on the other.

Acute Anterior Poliomyelitis in a Youth.—Dr. Theodore A. Hoch (Jour. of Nervous and Mental Dis., Sept. and Oct., 1905) reports a sporadic case of acute poliomyelitis in a boy sixteen years of age, terminating fatally thirteen weeks after the onset of the disease. The article recites the history and course of the disease and the pathologic findings in this case. A review of the literature covering the etiology, bacteriology and pathology of acute poliomyelitis concludes this valuable contribution, and the whole is summarized as follows: (1) Anterior poliomyelitis is the result of a primary inflammatory disease of the blood vessels of the cord, which may be thrombotic or embolic. (2) The destruction of the ganglion cells is secondary, and depends in part upon the deficient blood supply of the diseased area and in part upon pressure and toxins. (3) The pathological changes occurring in poliomyelitis of children and adults are apparently identical and dependent on similar causes. (4) There is sufficient evidence at hand to consider the disease, as a rule, of an infectious nature, however, not depending upon a specific microorganism, but resulting from bacterial infections of various kinds, and at times from other poisons. (5) The inflammatory changes are present in peripheral vessels as well as in the branches of the anterior spinal artery, though these changes are seldom visible until the vessels enter the gray matter. (6) The inadequate collateral circulation within the anterior horns is favorable for sluggish circulation and embolism.

Puberty and Adolescence in their Relation to the Etiology of Epilepsy.—William P. Spratling (N. Y. M. J. & P. M. J., May 20, 1905) concludes his article under above title as follows: First. That we can, and must, in many cases of epilepsy that appear during the twelfth to the sixteenth and eighteenth years, coincident with the establishment of the menstrual flow in women, and with the passing of boyhood into manhood, ascribe to these changes the power of inducing well-defined convulsions that may be epileptic. Second. That except in the most remote and exceptional instances, these periods alone in normal individuals have no power to induce epilepsy or even epileptoid phenomena. Third. That by searching carefully we shall find in most cases of epilepsy at this period, either a previous history of convulsions, usually in infancy, or a family and personal history so tainted with a tendency to disease that epilepsy under the stress of puberty is plainly invited.

Epileptiform Attacks During the Course of Dementia Praecox.—Paul Masoin (Journal of N. and M. Dis., Sept., 1905) briefly reports five cases of clonico-tonic seizures of varying character occurring during the course of dementia præcox. The occurrence of such seizures in this disease is rare and their pathogenesis is still less understood. The presence of these peculiar features in the course of dementia præcox has been observed by Kraepelin, but thus far no studies have been made bearing directly upon them. The principal motive in publishing his observations is the hope that others may be encouraged to bring forward similar data. The author compares these peculiar manifestations with other motor exteriorations of hebephreno-catatonic subjects, particularly the muscular paroxysms. "The impulse to movement, the incessant activity shown by these subjects seems to arise from a real necessity, to be dictated by a nervous hypertension (called by Kahlbaum 'Spannungsirresein') for which these violent externalizations are the discharge."

Chronic Constipation and its Consequences in Infancy and Childhood.—ROBERT HUTCHISON (The Clinical Journal, No. 657, May 31, 1905).

Of the minor maladies of early life there is none commoner or more far-reaching in its consequences than chronic constipation. It must be remembered that the bowel, after all, is a creature of habit, and if it is to be trained up in the way it should go, its education must begin early and carried out persistently. One feels perfectly certain that if habitual constipation in early life were taken more seriously and were more perseveringly treated, we should hear much less of chronic constipation in older persons than we do. Constipation in infancy is much commoner in breast-fed than in bottle-fed children. It is difficult to say why it is that breast-fed children should be so apt to suffer from chronic constipation; the author has not satisfied himself as to the reason for it. In some cases it may be due to some peculiarity in the mother's milk. A deficiency of fat in the milk may be a cause in some instances. He feels certain that in some of them it is due, not so much to deficiency of any ingredient as to the milk being altogether too poor in quality, too watery, with the natural result that it is absorbed almost completely, so that there is practically no residue left to stimulate peristalsis. In favor of this view is the fact that in many cases the habitual constipation is accompanied by persistent wasting, showing that the child is getting an insufficient amount of nutriment. There are cases of constipation which are accompanied by colic, where the child is more or less restless, draws up his legs, and shows all the signs which one associates with spasm in the bowels; and not uncommonly, if one can remove the colic, the constipation also disappears—"spasmodic constipation." There would seem to be a spasmodic contraction of the bowel which is the cause of the colic, and which is at the same time an obstacle to the onward passage of the intestinal contents. There is another group in which there is reason to suppose that the intestinal secretions are defective, in which the mother says that the stools are exceedingly hard, friable, and even chalk-like in appearance; and it is right to suppose that there is a defective secretion on the part of the intestinal glands, and possibly, also, defective secretion on the part of the pancreas and the liver. Again, it is possible that in some cases one has to deal with congenital atony or want of power in the wall of the bowel. Combined with this there may also be a deficiency of reflex nervous excitability. Constipation is particularly common and obstinate in children who suffer from any form of mental deficiency. It is particularly apt to occur in cretinism, and what one can best term infantilism, which, if not really a form of mental deficiency, is at all events an arrested development in which to some extent the brain participates. In such cases, the administration of thyroid to the child may act almost as a laxative. In these children the complicated nervous mechanism controlling peristalsis is either imperfectly developed or, at all events, sluggish. Of the consequences of habitual constipation, wasting is, perhaps one of the commonest. Poverty of the mother's milk is not the cause of wasting in every case; if an aperient is given and a regular action of the bowels is obtained, in many cases the child begins to gain weight straight away, even though there is no alteration in the feeding. The author thinks that in some cases it is due to deficient secretion of the intestinal juices. which leads to imperfect digestion of the food or to imperfect absorption of it. The wasting in some cases may be due to the continual restlessness which the constipation causes. The child is kept constantly uncomfortable, and as the attacks of colic come on, he screams and kicks about very vigorously. Also he sleeps badly, so that altogether he expends a great deal more muscular energy than does the normal child of that age. This all means a waste of tissue. There are certain mechanical consequences which should be borne in mind. One of them is the result of straining, which constipation induces. This strain falls most on the abdominal wall. One of the most obvious is the development of hernia, and particularly umbilical hernia. Another result of this constant straining is the occurrence of a partial prolapse of the rectum. There is a third and a rarer consequence, and that is the dilatation of the colon. There are reflex consequences, the result of the stagnation of intestinal contents and the irritation by those contents of the wall of the gut. Perhaps the most marked are disturbances of sleep and restlessness, often accompanied by twitching movements and sometimes ending in convulsions. On the other hand, babies seem to suffer much less from the toxic consequences of constipation than do older children. This is probably because the diet of infants consists almost entirely of milk, which produces a less degree of putrefaction in the intestines than does any other food. The treatment must be persistent by means of those aperients which exert a more or less tonic action on the bowels, and not by drastic aperients.

The object should be to educate the bowel to act spontaneously. Such aperients as aloes and cascara sagrada are the best. In bottle-fed babies you will find that adding phosphate of soda to the bottle is often enough to produce an action. One should add 5 to 10 grains to each feed; or one may sometimes give manna, which has a laxative effect. It should be dissolved in hot water and added to the food. Sometimes a grain or so of sulphur produces the desired effect when given with the baby's milk. In breast-fed babies, fluid magnesia is often found to be a useful aperient. Avoid treating constipation in the child by administering aperients to the mother. The author does not think the tendency to administer aperients by the lower bowel is much to be commended. In the form of soap suppositories or small injections, in some cases, the treatment is good enough—in those cases where the constipation is due entirely to stagnation in the large bowel and the defective action of the lower part of the large intestine. As many cases are due to a cause operating much higher up, such a method is not to be commended, because it acts upon one section of the bowel only. The habitual use of laxative enemata or suppositories is also apt to result in a certain amount of irritation of the rectum, setting up a chronic catarrh or proctitis. As an accessory massage is always a plan to be adopted. It undoubtedly helps where the constipation depends upon a defective muscular tone in the large bowel. It is futile to expect that by rubbing anything on the abdomen it will find its way in, and produce laxity of the bowels in that way. Aloes is best given to little children in the form of the tincture. For a child aged six months 3 to 5 minims will be sufficient. With that may be combined some other aperient drugs. One form of aperient acts on the muscles, another on the nerves, and another on the secretions, and one wants to combine the actions of all. For instance, one can give tincture of aloes with the idea of stimulating the peristalsis, and also 10 grains of sulphate of soda to increase the secretion. It is necessary to prevent the griping action of the aloes, so that one adds 1 minim of the tincture of belladonna to the mixture. It is also well to give a carminative (such as syrup of ginger, 20 minims) and peppermint-water to 1 dram. Some such mixture should be given both night and morning, or oftener. One has to find out what dose is required to produce a daily action, and having found what dose is required, to keep it up for a number of weeks. It should then be gradually discontinued until the bowels have learnt to act spontaneously. Sometimes even that combination of aperients is not sufficient. In such a case you may add syrup of senna, which acts on the small bowel as well as on the large one, 15 to 20 minims of the syrup being added to each dose. "Purgen" produces fairly satisfactory results in doses of ¾ to 1 grain twice a day. It acts mainly by stimulating secretion, with no griping; but does not seem to exercise any tonic effect. If the motions are white, chalky, or friable, there is nothing so good as podophyllin, 1 or 2 minims of the tincture two or three times a day being the dose. If there is much straining and the motions are hard and passed with much difficulty and tenesmus, one will find sulphur gives specially good results in the form of the confection, in half-teaspoonful doses. It softens the motions in a wonderful way, and children take it well.

Operation for Cleft-palate in Infants.—Sir Thornley Stoker (Brit. Med. Journal., June 24, 1905).

The author reviews the modern treatment of cleft-palate, with special reference to the new method of approximation of the superior maxillæ by Brophy of Chicago.

Brophy's operation is done from ten days to three months after birth. It consists essentially in drawing the upper maxillæ and palate bones of opposite sides together by wire sutures, generally two in number, passed transversely through the alveolar processes above the bend of the palate processes of the maxillæ and palate bones. This method cannot be done successfully after the age of three months, as the bones are too fully ossified to be displaced by any force that could be safely applied. Stoker has used this method in three cases with satisfactory results.

Brophy's arguments in support of the method are quoted: "1. The surgical shock is less because the nervous system of a child is not well developed, and it is not therefore capable of receiving the same impressions that it would later in life, for young children usually react better. Moreover, all mental apprehension is eliminated, and we know that alarm and dread are among the most powerful factors in producing shock. 2. Before the bones are fully calcified they may be bent or moved without fracture. 3. If the muscles are very early brought into action they develop instead of atrophy, and hence a good return is secured, with plenty of tissue; whereas if the operation is undertaken later in life, after the parts are shrunken through non-use, they can rarely be made to subserve the same purposes as organs which develop through natural employment. 4. When the palatal processes of the maxillæ are united, it will be observed that the development of the bones of the alveolar processes of the upper jaw assumes a form nearly or quite normal, and when the teeth are erupted they will properly occlude with the lower ones, or nearly so. It was predicted by my surgical friends that the upper jaw would be much narrower than the lower one, and that it must always remain contracted. (Brophy shows that this has not occurred). 5. Following early operations there is much less deformity, for all the tissues, bony as well as soft, develop naturally and according to accepted types. 6. When the operation is made in early infancy, the parts are sufficiently advanced to give possibility for normal speech when the time comes for learning to articulate. If the operation is not made until faulty habits are acquired, it is with difficulty that they can be overcome, even supposing the muscular parts could be made sufficient."

The stages of Brophy's operation as described by himself are as follows: "1. Thorough paring of the edges of the fissures, including in the incision the edge of the semicartilaginous bone. 2. Then raise the cheek, and well back towards the posterior extremity of the hard palate, just back of the maxillary process, and high enough to escape all danger of not being above the palate bone, insert a large braided silk suture, carrying it through the substance of the bone to the central fissure by means of one of the strong needles, with the opposite needles carrying a corresponding silk suture through the opposite side. We then have two silk suture loops carried to the center of the cleft, and passing one through the other enables us to carry one loop through both of the maxillary bones. 3. The silk is more easily introduced by the needle than wire, but a silver wire should always be substituted for it and drawn through to take its place. The wire should be No. 20, and may be doubled in case the condition of the parts and the tension upon the tissues necessary to approximate them seem to require it. Nearer the front portion of the maxilla insert another wire, carrying it through the substance of the bone above the palate plate, and through the other side in a position corresponding to the place of entrance. Thus we shall have one wire passing over the palate in front of the malar process of the frontal bone and another behind it. 4. The next step is to make lead plates to fit the convexity of the buccal surfaces of the bones. Have them provided with eye-holes, through which are passed the protruded ends of the wire on each side. Twist these together—that is, the right end of the posterior with the right end of the anterior wire, and the same on the left side. These form heavy tension sutures, and the parts when once approximated by their use cannot be separated, as the sutures do not cut out. If the cleft is a very wide one, and we are not able to close it by twisting the wires together on the lead plates, force may be exercised with the thumb and fingers, or by means of a forceps designed for that purpose. If by such force the edges of the cleft do not approximate, there is a further step to be taken which will obviate these difficulties. After the cheek is well raised, divide the membrane and the bone through the malar process, carry the knife in a horizontal direction, and when well inserted sweep the handle forward and backward. In this way a maximum amount of bone and a minimum amount of mucous membrane will be divided. This done on either side, the bone can readily be moved towards the median line. The next step in the operation is the insertion, if necessary, of interrupted sutures in the soft coverings of the hard palate and in the soft palate, if it is decided to close this at the same time. The premaxilla is then dealt with. Its sides are trimmed, a **V**-shaped piece of bone removed from the vomer so as to allow it to be moved back, and a suture inserted to hold it between the alveolar processes. At a later date, when all sutures are removed, the hare-lip can be operated upon. Stoker uses this operation with slight modifications. The edges of the palate are pared after the sutures have been inserted and the bones moved toward the middle line. The period for hemorrhage is thus lessened. Also, if the bones cannot, with reasonable force, be brought together, it is better not to pare the soft parts at this time. It must be remembered that the sutures act in two ways, at first by drawing the parts together, and subsequently by holding them fixed so that they approximate by the process of their growth. It is therefore better, where full approximation of the maxillæ cannot be done at the time of operation, not to waste time by an ineffectual paring, but to wait and do it later on, when the bones are touching. Again, the lower edge of the vomer is often thick and vascular, and may grow into the cleft and help close it. Brophy apparently advises the soft palate to be operated on at the same time as the hard, and Stoker has carried this out successfully in one case. The proper course seems to be to pass the sutures and move the bones; if they can be got into close apposition, to pare the edges of the hard palate and fix the sutures; if they cannot be thoroughly approximated, to defer the paring process until the maxillæ have grown into apposition, and then do it if necessary. If the hard palate is thoroughly closed at the primary operation, it would be best to then trim and suture the soft palate, or under less favourable circumstances to defer its closure. There can be no objection to leaving the hare-lip until the hard palate has been closed. Free access to the mouth is thus obtained, and the operation is easy. No gag is used and no special instruments are required; the sutures can be passed by Liston's nævus needles. The plates and sutures do not seem to cause inconvenience to the child. The three cases in which Stoker performed this operation were of great deformity, with hare-lip, projecting premaxilla, and wide separation of the hard and soft palate. He regards the operation as one of great importance, although it cannot always be carried out with academic perfection.

A Case of Hereditary Syphilitic Polymyositis in an Infant.—DR. HOCHSINGER (Wiener Medicinische Wochenschrift, July, 1, 1905).

The lesion in this malady consists in a syphilitic affection of the muscles and joints. In the case under discussion a symmetrical enlargement in the region of the elbows was apparent at the first glance; the swelling was but little painful. The swelling commenced in the lower third of the forearm, and attained its greatest thickness over the elbow joint, and gradually disappeared in the course of the upper arm. Examination by the Röntgen rays proved that the lesion did not affect the ends of the bones, but the muscles surrounding the epiphyses of the elbow-joint. A marked defect in the bone substance of the ends of the diaphyses was detected. The areas of calcification at the ends of the diaphyses of the elbow and knee-joints had almost completely disappeared, and at the distal epiphysis of the forearms early stages of osteochondritis were perceptible. The thickening of the surrounding muscles was perfectly clear on radioscopic examination. The whole of the muscular structure surrounding the epiphysis of the elbow-joint was swollen and thickened, and this more on the right than on the left side. The author emphasizes the fact that in these cases the symptoms are not the result of a spinal cord lesion, but that the paralysis is of muscular origin. In the present case the symptoms were accompanied with marked evidence of heriditary syphilis, and a fortnight after appropriate treatment was commenced the paralysis began to amend. In some cases the upper extremities, and in some the lower are affected.

A Note on Appendicitis in Children.—R. C. DREW, (Glasgow Medical Journal, June, 1905).

The majority of the author's cases of appendicitis in children have occurred between the ages of ten and fifteen; at this time of life errors of diet, want of supervision as regards action of the bowels, and strains are more likely to take place than at an earlier period. The youngest case in the author's experience was a child of twelve months, while the earliest recorded case was an infant of seven weeks. The author does not consider that there is any greater tendency to pus formation in the appendicitis of children when the case is diagnosed at an early stage and suitable treatment adopted. Yet the surgeon certainly sees relatively more cases in young in which suppuration has occurred than he does amongst adults. The explanation is that the earlier and slighter manifestations of appendicitis in children are often not recognised and are therefore not efficiently treated; it is only when the disease has passed into a more severe stage that the true state of affairs is discovered. Hence it is of supreme importance to recognize and correctly interpret the group of slight symptoms which indicate the milder degrees of inflammation of the appendix occurring in children. There is far more difficulty in diagnosing early appendicitis in children than in adults. This arises from the resemblance between the symptoms of appendicitis and those of common and simple gastro-intestinal disturbances in children. Early symptoms of appendicitis are: Abdominal pain resembling colic, usually referred to the umbilicus, slight tenderness in the right iliac fossa, nausea and vomiting, flatulence, tenesmus, and diarrhea. Diarrhea is the usual condition of the bowels most met with in children suffering from appendicitis. In adults constipation is almost invariably present. The child is out of sorts, the temperature may be normal, but the pulse-rate is somewhat increased. Such symptoms as these often disappear in a short time, and they frequently are regarded as of no importance. Yet when these symptoms are present, the possibility of appendicitis should never be forgotten; this is especially important when such attacks recur from time to time. When the attack is somewhat more severe, the temperature being raised, diagnosis is more easy. In such cases it will often be found that the abdominal muscles over the right iliac region are "on guard"; in some cases, but rarely, the enlarged appendix can be felt. Colic and acute dyspepsia both give rise to symptoms resembling those of appendicitis, and must therefore be eliminated. In colic the pain is less severe than in appendicitis, and is not localized. Neither tenderness nor fever occurs, and the attacks are of shorter duration. From dyspepsia the diagnosis is much more difficult, and it may be impossible in the early stage. But there is no tenderness on pressure over the right iliac region. When peri-appendicular inflammation has occurred, and a localized peritonitis is present, the diagnosis is usually easy. But the author has found even then that diarrhea is more usually present than constipation. Muscular rigidity is well-marked, and distinct local resistance to palpation is present, the constitutional disturbance also being considerable. Bladder irritation—painful and frequent micturition, and sometimes retention—is often observed. This is explained by the abdominal position of the bladder in children, and its consequent close relation to the appendix. By bimanual examination—one hand on the abdomen and a finger in the rectum—much valuable information as regards the condition of the appendix may be obtained. In this stage of the disease it is important to ascertain whether or no pus has formed. The author considers that when acute symptoms of appendicitis have persisted in spite of treatment for four days abscess is present. And the same may be inferred if the temperature remains raised, though the other symptoms gradually subside, or if the temperature becomes normal and then shows irregularity. And after the disappearance of acute symptoms, should the local swelling persist, it is probable that pus is present. A rectal examination is often of the greatest service, and definite fluctuation can frequently be obtained on bimanual palpation. As regards the the leucocyte count, the author finds that localized abscess is present when the number of leucocytes per cubic centimetre is 15,000. As regards treatment, even the mildest cases should be kept in bed for several days after all symptoms have disappeared. A fluid diet only should be given, and while vomiting persists nothing should be taken by the mouth except sips of hot water. The pain is always amenable to hot fomentations. The author does not give purgatives, making use of enemata if anything is required. As regards the advisability of operation, when two or three attacks of mild appendicitis have been gone through the appendix should be removed. But excessive operative zeal is to be deprecated.

The Therapeutic Importance of Lumbar Puncture in Children.—L. Tobler (Corr.-Bl. f. Schweizer Aerzte, April 1. p. 209).

In Vierordt's clinic in Heidelberg lumbar puncture has been practised 152 times on 71 patients. Children bear the operation better than adults, probably because their circulatory system is more elastic. In infants with open fontanelles the central nervous system is not encased in a rigid canal, and the withdrawal of even large quantities of cerebro-spinal fluid is compensated for by depression of the fontanelles and distention of the vessels. Serious complications after puncture are, in childhood, practically unknown, but in cases of tumor or suspected tumor of the brain the procedure is best avoided, as most of the 30 fatal cases in adults were of this nature. Unimportant complications, such as headache, vertigo, vomiting, and rapid changes in the character of the pulse, are not uncommon, though in young children only the last two are apparent. In rare cases symptoms of irritation of the meninges and especially the spinal meninges followed puncture. These consisted of pain and stiffness of the back and neck, the latter being sometimes retracted, Kernig's sign, exaggerated knee-jerks, slight muscular spasms, radiating pain in the legs, and vomiting. But they never persisted for more than a few days. If rapid changes of intra-spinal pressure, which may produce punctiform hemorrhages in the spinal meninges, are avoided, these symptoms would rarely, if ever, occur. The puncture should be made only while the patient is lying down, in which position the escape of the cerebro-spinal fluid is slower, and the manometric readings are more exact. The more cerebro-spinal fluid is present, the more may safely be removed. In a girl, aged 9, with epidemic cerebro-spinal meningitis, amounts not exceeding 100 c. c. were removed successively with the best results. In 2 cases of hydro-cephalus in infants under 12 months, 400 and 650 c. c. were removed at one sitting. If the escape of fluid is rapid the flow should be frequently interrupted. If any change occurs in the pulse, or there is vomiting, pallor, or alteration in the pupils, the operation should be immediately discontinued. The patient should be firmly held or anesthetised.

Lumbar puncture is useless in tuberculous and purulent meningitis (of aural, scarlatinal, or influenzal origin). In serous meningitis, which in children is difficult to distinguish from some forms of hydrocephalus, a favorable result may be obtained. But the most satisfactory results—and in this the writer is supported by many authorities—are occasionally obtained in epidemic cerebro-spinal meningitis. In three of seven cases the headache and general hyperæsthesia disappeared, quiet sleep was obtained, retraction of the head became less, and nourishment was well taken. In one case recovery followed a single puncture, in another a slight relapse occurred 3 weeks after apparent recovery, and in the third 3 punctures effected a permanent cure. In another case puncture diminished the headache, but was otherwise ineffectual. In the remaining 3 cases puncture appeared to have no good effect, and death occurred.

In chronic congenital hydrocephalus temporary improvement is all that can be expected after lumbar puncture. Something is gained, however, if a rapid increase in the size of the skull is prevented until spontaneous cure results. In 2 cases of secondary hydrocephalus after meningitis lumbar puncture had a favorable effect, and the writer advocates its use shortly after the acute stage is passed. In a case of post-meningitis idiocy in a boy, aged 8½, 4 punctures at intervals of a few months, and the withdrawal on each occasion of 20 c. c. of normal fluid, caused decided improvement, and the patient became less restless and more attentive.

The Pathology and Treatment of the Hernias of Children.—Edred M. Corner (International Clinics, vol. ii., p. 153).

There are two great factors in the production of the hernia in children. One, a predisposing condition, is a congenital malformation: the tunica vaginalis and the peritoneal cavity remaining in communication (so-called congenital hernia). The second factor is gastro-intestinal fermentation with the production of gas and consequent distension of the abdomen. As a result, the weaker parts of the abdominal wall yield and one or more hernial protrusions appear. Multiple hernias, such as inguinal and umbilical, are common. Rickets, offensive stools, etc., indicate the digestive incapacity. The frequency of a communication between the tunica vaginalis and the peritoneal cavity is shown in the hydroceles in children. Careful inquiry or the direction of the mother's attention will reveal the fact that the hydrocele is less tense in the morning than it is at night, because some of the fluid has found its way into the peritoneal cavity through a communication from the tunica vaginalis. The presence of a strait or neck can be demonstrated as a distinct thickening in the cord of that side. The more frequently and carefully this communication is looked for during the course of an operation, the more frequently it is found. Some observers have demonstrated the existence of fluid in the abdomen of children suffering from hydroceles. The fact that these hydroceles are in potential hernial sacs demands that the treatment should be that of hernia, and shows the futility of the ordinary treatment by scrotal discutients. Further, recent hernias in adults are found to have congenital sacs. Therefore, the presence of a communication between the tunica vaginalis and the peritoneum, alone, is insufficient to cause a hernia. The increase of intra-abdominal pressure, the active factor, is necessary. Finally, when operating on the hernias of young children recent sacs unconnected with the tunica vaginalis are frequently found. These considerations have led the writer to assign great importance to gastro-intestinal fermentation in the causation of hernia in children; and to look upon congenital malformations of the tunica vaginalis as merely predisposing conditions.

Hernia and Phimosis.—The current view of the importance of phimosis in the causation of hernia in children is erroneous. The urinary opening in the prepuce is rarely so small as to be of paramount importance. If it were the prepuce would become ballooned and distended with urine during micturition. Such a phenomena would hardly be unnoticed by the mothers. Yet the writer has never been able to obtain such a history. The operation of circumcision raises false hopes, and is rarely followed by any improvement in the hernia. Circumcision must be combined with other treatment and is only of secondary value compared with medicinal treatment. Doubtless this small operation is practiced far more often than is necessary. In most cases it may be regarded in the light of a procedure of expediency rather than of necessity. A small meatus urinarius in the small glans penis is often associated with a tight prepuce and is the true cause of the child's straining during micturition.

The truss is supposed to cure the ruptures of children. But it has not been made clear how it does so. It may cause matting of the tissues about the neck of the sac by means of the pressure which it exerts. Perhaps, in a few instances, it may also cause obliteration of the canal of the neck of the sac by peritoneal adhesions. But the situation of these adhesions will be well below the level of the peritoneum, and therefore will at best be comparable to the bad application of a ligature to the sac. Besides, by preventing the descent of abdominal viscera, it will prevent further distension of the sac and enable natural growth to assist in, and perhaps perpetuate, the "cure." The most popular truss for babies and young children is a skein of wool. The pressure of this soft truss is quite insufficient to bring about the obliteration of the channel of communication. The second favorite is a spring truss used on adults. There are two main objections to this truss: (1) as the child is growing, the truss never fits for any length of time; (2) it will press on the structures of the spermatic cord and injure the testis. In adults, trusses occasionally cause subacute orchitis or fibrosis of the testis, from obstruction to the venous return. But intererence with the circulation of the developing testis of a child is still more serious. Orchitis, atrophy, and hardening by fibrosis, which will cause growth in the organ to cease, will result. The presence of one good testis will insure spermatogenesis, but the early atrophy of one testis will lead to some imperfection of the male secondary characters, such as deficiency of the growth of hair on the face, high-pitched voice, etc. The earlier the age at which the atrophy occurs the more marked will be the deficiencies. After puberty, that is, when once these characters are developed, they seem to be more or less permanent, no matter what the subsequent conditions of the testes. It is therefore impossible to cure a hernia in a congenital sac by a truss which will not injure the testis; yet hernias in children are cured. Probably these are not in congenital sacs.

Those which are, are curable only by operation. The writer's operations have led him to believe that acquired sacs are much more frequent in childhood than is supposed. It is improbable that these sacs can be cured by the obliteration of the neck of the sac by the pressure of the truss, without injuring the testis. But there is another explantion of the cure.

The acquired hernial sac is produced largely by the increased abdominal pressure caused by gas due to fermentation in the intestines. When this fermentation subsides, under treatment or otherwise, the cause of the protrusion ceases to exist. As the child grows, the increase in size of the body will lead to retraction of the acquired hernial sac into the abdomen; in this way it may be pulled up and the hernia disappear. Then the ring will grow normally and correctly, the growth correcting the deformity which resulted from the hernia, exactly as in the case of the curvature of bones. It is difficult to give direct evidence for this hypothesis but the following facts point to it. (1) The writer has seen the complete disappearance of inguinal hernia in a child, in which the testis was quite separate from it: presumably, therefore, the sac was an acquired one. This occurred both in cases treated with and without a truss, and in both sexes. (2) He operated in a case in which there had been a distinct history of a hernia in childhood. The patient was a woman, aged between 25 and 30, who had been advised to undergo an operation on the supposition that hernia was present. No sign of it could be detected, and operation was performed in order to satisfy the patient. There was no trace of a sac in the inguinal canal. (3) In operating upon the variocles of young men who gave a clear history of hernia in childhood no trace of a sac could be found. (4) Upon a man, aged 21, an operation was performed for radial cure for an inguinal hernia which had appeared a few weeks before. There was a definite history of a hernia in the same situation from the ages of 1 year to seven years. For 14 years the rupture remained "cured." Then a smaller hernia appeared. The sac was of the acquired variety, thin, and easily separated from the structures of the spermatic cord, showing all the evidence of recent origin. There was no trace of the former sac.

If this theory of the natural cure of acquired hernial sacs is true it should apply to congenital sacs; that is to say, when the tunica vaginalis and the peritoneal cavity are in communication, so causing the late appearance or imperfect descent of the testis. The writer obtained the history that a testicle was in its proper place in a baby, and that later it became imperfectly descended. On operating, the imperfectly descended testis was found accompanied by a congenital hernial sac. This suggests the explanation offered—natural growth retracting into the abdomen the hernial sac—and at the same time offers another example of the new class of acquired or secondarily imperfectly descended testis.

If these views are accepted, the methods of treatment must be modified. As trusses are likely to be useless, if not mischievous, nothing short of operation is likely to cure a hernia in a congenital sac. The hernia in the acquired sac offers more scope for non-operative treatment. The active factor in its production, the increase of intra-abdominal pressure due to gastro-intestinal fermentation, can be treated. Hence the importance of diagnosing which form of hernia is present. The "hernia" should be prevented from coming down by the use of a woollen or other light truss and adopting the recumbent position of necessary. A more forcible truss may be used for females than males. By attention to the diet much can be done to cure and prevent hernias. Purgatives and other intestinal cleansing agents should be given. As the fermentation which causes the abdominal distension is acid an alkali should be given. The following are prescribed at the Hospital for Sick Children, Great Ormond Street:—

Pulv. Rhei c. Soda
    Pulv. Rhei gr. 6
    Sodii Bicarb. gr. 3
    Pulv. Zingib, gr. 1
  To make two powders.
Pulv. Hyd. c. Soda
    Hyd. c. Cret. gr. 1
    Sodii Bicarb. gr. 2
    Pulv. Cret. Aromat. gr. 4
  To make two powders.
Pulv. Rhei et Hyd. c. Cret.
    Hyd. c. Cret. gr. 2
    Pulv. Rhei. gr. 6
    Pulv. Cinnamoni gr. 1
  To make two powders.

Under this treatment many acquired hernias may be cured. If not, an operation for radical cure should be performed, so that the growth of the child may remove the deformity of the internal abdominal ring resulting from the hernia.

In a discussion on this paper at the Wood Green Medical Society in Oct., 1905, the writer stated his views on the following 3 points:—

(1) The diagnosis between acquired and congenital hernia is to be made as follows: If, when the hernia is down, the testis is free from it and not obscured the sac is acquired. If the testis is obscured the sac is congenital.

(2) Is hernia due to gastro-intestinal fermentation seen in breast-fed babies? Yes. No fewer than 3 cases were seen in 1 day among the out-patients at Great Ormond Street.

(3) In deciding upon operation the age of the child is not so important as the duration of hernia. The writer suggests

3 years as the limit of time which a hernia should be allowed to exist. If a longer period is allowed deformity of the inguinal canal is produced, resulting in a permanently weak spot.

Acute Osteomyelitis and Periostitis of the Spine.—Tubby, (Brit. Med. Jour., Sept. 30, p. 807).

These affections are important, because of the serious symptoms, and of interest, because of the difficulties in diagnosis and treatment. The earlier records speak of exceedingly acute cases; but extended experience and more discriminating diagnosis have shown the existence of less acute and non-suppurative cases, which run a benign course. Three forms are recognizable:—

1. A comparatively mild form, from which the patient usually recovers, in which there is inflammation and thickening of the periosteum, which subsides without apparently causing denudation of bone, and leaves the spine practically normal.

2. A severe form, involving the periosteum and superficial layers of bone, associated with considerable inflammatory softening, and often with considerable deformity, which may or may not go on to suppuration.

3. An intense form, in which the bodies of the vertebræ contain numerous purulent foci, or the neural arches and processes are bared and necrossed . This form usually goes on to suppuration; inflammation of the spinal membranes and medulla is a constant complication, and it is, therefore, exceedingly dangerous to life.

The following is an example of the mild form:—

Acute periostitis of the cervical spine; resolution without suppuration; complete recovery.

A girl, aged 4½, was seen for pain and loss of mobility in the neck, and malposition of the head. Four months previously she had a severe stomatitis, with much prostration, high fever, and depression. When the acute symptoms were passing off she was seized with pain in the back of the neck which radiated towards its anterior aspect. The nape of the neck became very edematous, and thickened. This edema lasted from 3 to 4 days but no fluctuation was detected. When the swelling passed away the neck was found to be stiff.

The first impression was that she was suffering from torticollis of the rheumatic type. The neck was stiff and rigid, the head was inclined to the right, the chin was rotated towards the left. The loss of movement was absolute, and attempts to move the head in any direction gave rise to great pain. All the cervical vertebræ were fixed and immobile, the normal cervical curve forwards was flattened and some thickening could be felt about the transverse processes. Infective periostitis was diagnosed, and as there were no signs of suppuration a favorable prognosis was given.

The treatment consisted in absolute rest in the recumbent position with a pillow beneath the cervical vertebræ for 3 months. Then she was allowed to get up for half the day, wearing a cervical collar. A year afterward she had lost all pain and distortion of the neck; she could move the neck without discomfort in every direction; and the cervical vertebræ were mobile in all directions. The only sign of the previous trouble was a slight prominence of the fifth cervical spinous process.

This case ran a benign course fom beginning to end. Probably many cases which are called rheumatic torticollis occuring in children after acute illnesses are of this nature.

The following is an example of the severe form:—

Acute periostitis and rapid softening of bone associated with double pneumonia and necrosis of the alveolar margins of the jaw; recovery.

A girl aged 5 was seen. Six weeks previously she had been taken ill and her brother had suffered in the same way. The symptoms were so anomalous that no diagnosis could be made. As influenza was rife it was suspected. Double pneumonia occurred, and then acute stomatitis with gangrenous destruction of the gums and acute osteitis and periostitis of the alveolar margins of the upper and lower jaws, particularly in the incisor regions. Sequestra formed and were removed. Three days before she was seen the child complained of pain in the lower part of the neck and down the legs.

There was a large prominence involving the second, third, and fourth lumbar vertebræ. The child resented any attempts to move her. There were no signs of paralysis. On feeling the prominence the impression received was that the affected lumbar vertebræ had sunk bodily backwards. The spinous and transverse processes were much thickened. The temperature was not raised, and no evidence of abcess was found at any time. From the history, the rapid appearance of the prominence, the rigidity of the muscles, the loss of mobility, and the tenderness, it was not difficult to recognize that it was infective periostitis. The opinion was hazarded that if suppuration did not ensue recovery would be entirely satisfactory.

The treatment consisted in complete recumbency in the supine position, with a convex pillow placed beneath the lumbar spine for part of the day. For the remaining part the position was changed to the prone one, so as to assist in recovering the normal lordosis. After 2 months a spinal support was fitted with beneficial results.

Prophylactic Action of Urotropin in Scarlet Fever.—BUTTERSACK (Med. Cor.-Bl. d. württemb. ärztl. Ver., Stuttgart, 1905, October 14).

Buttersack recommends the prolonged administration of urotropin as a prophylactic measure, to prevent the development of nephritis in scarlatina. As a rule, it is between the twenty-first and twenty-fifth day of the disease that the nephritis shows itself, and consequently previous writers have advocated the intermittent administration of urotropin, e. g., from the first to the fourth, from the ninth to the twelfth, and from the seventeenth to the twentieth day of illness. But Buttersack, in view of the rapid elimination of urotropin, preposes that the administration should be continuous up to the twenty-first or twenty-fifth day. In a series of thirty-five cases treated on this plan, he has had no case of nephritis, though in isolated cases a trace of albumin suddenly appeared, with a few hyaline and epithelial casts and epithelial cells from the upper urinary tract, but without edema or alteration in the appearance, quantity, or specific gravity of the urine.

Idiopathic Edema in Infancy and its Relation to the Excretion of Sodium Chloride and Phosphate.—LUDWIG F. MEYER (Deutsche Med. Woch., Sept. 14, p. 1464).

"Idiopathic" or "essential" edema occurs independently of nephritis or of casts in the urine ("Review," 1903, p. 534). It is rare in adults but comparatively common in infants. It has been attributed to "cachexia," and to latent disease of the heart, blood vessels, or kidneys, and toxemia. Widal found that the degree of edema in nephritis depends largely on the amount of sodium chloride contained in the food, and Hutinel states that this applies to the edema of infants without nephritis. The writer has observed the influence of sodium chloride and phosphate on the edema of infants in 3 cases:—Case 1.—A child, born on April 20, was admitted on April 29. The weight was 2,300 gm. It was weak but active. There was intense redness of the buccal mucosa. After May. 10 it was given six feeds daily of 50 gm. of buttermilk with cream and milk sugar. On that date began an attack of acute dyspepsia with a rise of temperature to 105.4°, and albumin, sugar, and casts in the urine. On May 12 nothing but a small quantity of tea was given. Improvement occurred and on a greatly restricted diet (12 feeds of 10 gm. of centrifugalized breast-milk) was maintained. On May 18 the urine and temperature were normal. The loss of weight during the illness was 600 gm., i. e., a quarter of the total body-weigth. From May 27 onwards the daily diet consisted of 240 gm. of breast-milk (not centrifugalized). On May 29 there was slight edema of the back of the right hand. On this date 1 gm. of NaCl was given daily in the food. The edema rapidly spread over the whole body. On May 30 it had affected the back of the left foot and thigh; on May 31 the face; on June 1 both arms and legs and the back. There was well-marked pitting. During this period the weight rose from 1,850 to 2,320 gm., i. e., 450 gm., about a quarter of the body-weight. That this increase was due to the edema was shown by the rapid loss which occurred after June 2 when the NaCl was discontinued. On June 12 the weight was 2,000 gm. The urine was repeatedly examined after the onset of edema, but neither albumen nor casts were found. The child died in August of acute dyspepsia. Post mortem no nephritis was found.

Case 2.—A child, born on April 22, was admitted on May 16. It was of healthy appearance, but there were slight jaundice and intense pharyngitis. The nourishment consisted of a mixture of 1 part milk and 2 parts of a dilute improved form of "Liebig's soup" (a malted wheaten-flour preparation containing a large proportion of salts). On May 24 the quantity of food was reduced owing to slight intestinal disturbance. This was of short duration and the amount of food was again increased, until on May 28 ten feeds of 30 gm. each were given. On May 26 edema of the backs of the feet and of the legs appeared. One gm. of NaCl was then given daily in the food. The edema increased, and on June 2 had involved the face arms, hands, and scrotum. The circumference of the left thigh was 14 cm., and of the right 13 cm. There was marked pitting. The weight was 2,580 gm. On June 2 the NaCl was discontinued, and 300 gm. of human milk, which contains but little NaCl compared with cow's milk, were given daily. The weight promptly sank and in a few days was 2,160 gm. (a loss of 420 gm., or about one-sixth of the total body-weight). The circumference of the left thigh was 10.5 cm., and of the right 10 cm. Later the child was given "malted soup," and developed convulsions (possibly due to salt-intoxication) and edema. It was agin given the breast and throve well.

Case 3.—A child, born on Feb. 27, was admitted on Mar. 6. It was weakly and of an icteric tint. On Mar. 15, while on a diet of 70 gm. of buttermilk with cream and milk-sugar 6 times daily, symptoms of acute dyspepsia with albuminuria and casts developed, and on Mar. 23 the weight was 620 gm. less. For one day only small quantities of tea were given and for some days afterwards extremely small quantities of a mixture of 1 part of raw cow's milk and 2 parts of improved "Liebig's soup." The symptoms disappeared. The quantity of food was then increased—probably too rapidly—and on

Mar. 31 it amounted to 100 gm. of the mixture 6 times daily. Edema of the backs of the feet then developed and on April 5 had involved the whole body including the face. The amount of NaCl in the food was then restricted by giving only a mixture of equal parts of milk and Liebig's soup 5 times daily. The edema rapidly disappeared and on April 13 the weight had fallen from 3,000 to 2,500 gm.

Was the disappearance of the edema due to restriction of the fluid in the food or of the amount of NaCl? Between April 13 and 17 about 2 gm. of NaCl were daily added to the food, which was otherwise in quantity and quality the same as on April 5. The weight immediately rose from 2,500 gm. on April 13 to 2,950 gm. on April 18, and on April 14 there was already edema of the face, which soon involved the whole body. The NaCl was then discontinued. The edema slowly subsided, and on May 1 the weight was 2,550. Experiments were made to decide whether increase of fluid in the food without the addition of salt (200 gm. of distilled water were added) would produce edema. No edema resulted, and the weight in 4 days increased by only 40 gm.

Sodium Chloride is not the only salt which is implicated in the production of edema; the other salts in the food contribute. Sodium phosphate is probably of equal importance with sodium chloride. On May 5 and onwards 2 gm. of sodium phosphate were given daily. The weight rose in three days from 2,580 gm. to 2,800 gm., and there was edema of the face, thighs, and the backs of the feet. The phosphate was discontinued and the weight sank until on May 17 it was 2,500 gm., and every trace of edema had vanished. To meet the objection that the doses of salt and phosphate were greater than those normally contained in food the writer tried the effect of adding 200 c. c. of whey, containing 0.056 gm. of NaCl and 0.1451 gm. of P_2O_5, to the food. The weight rose though not so suddenly (in 5 days from 2,560 to 2,770 gm.), and though edema was produced it was less marked. The lines in the face were obliterated so that it appeared bloated and the back of the left foot became edematous.. The edmea rapidly subsided when the whey was discontinued, and the weight on May 31 was 2,550 gm.

During the experiments the urine was examined almost daily, but albumin and casts were invariably absent. The temperature was seldom above normal, the stools were normal, and the cardiac sounds were loud and pure. The child laughed and took the food well. Afterwards it was given the breast and throve. But on June 7 (17 days after the last attack of edema), without apparent cause, it suddenly died. At the necropsy nothing was found to account for death and the kidneys and heart were both macroscopically and microscopically normal.

In cases 1 and 3, certainly, and in Case 2, probably, an acute disturbance of nutrition with renal irritation preceded the onset of edema. That there was no nephritis was shown by the evanescent character of the renal symptoms and in Cases 1 and 3 by the necropsy. In no case after the onset of edema were casts or albuminuria present. The onset invariably coincided with an increase in the amount of food and consequently of the NaCl. In each case the administration of NaCl produced a rapid increase in the edema, and its omission an equally rapid disappearance.

Experiments on metabolism were made in Case 3, the total quantity of sodium chloride and phosphates ingested and excreted being made daily. During the administration of NaCl on April 15 and 16, the amount of urine was respectively 100 and 125 c. c., and during the administration of sodium phosphate, between May 6 and 8, 98, 77, and 125 c. c. After the administration was discontinued the amount rose to 210,393 (after NaCl) and 210, 161, 212, etc. (after sodium phosphate). The largest amounts of urine and salt were always excreted on the days on which the greatest loss of weight occurred.

During the administration of sodium chloride or phosphate there was considerable retention of these salts in the body, which were afterwards gradually excreted. The writer is convinced that retention of NaCl is a pathological process. A normal body always responds to increased ingestion of NaCl with increased excretion. In the case of sodium phosphate the case is complicated by the fact that increased ingestion may be followed by increased assimilation of phosphorus. But in this case the amount retained was too great to be explained in this way and was evidently pathological. Though in Cases 1 and 3 the kidneys were anatomically normal the renal irritation, which occurred 4 months before death, may have produced a functional derangement of that part which is concerned with the excretion of salt, viz., the epithelium of the uriniferous tubules. At a certain concentration they probably refuse to excrete the salt, which consequently accumulates in the circulation, until it is excreted into the tissues, in which it attracts water and produces edema. It follows that the treatment of the "idiopathic" edema of infants is to reduce the salts of the food. For this purpose the breast should be given or, if this is not possible, cow's milk diluted and, if necessary, with sugar added. Artificial foods, such as Liebig's soup and Theinhardt's preparation, which contain a large quantity of salts, are to be avoided.

Butter-Milk in the Gastro-intestinal Disorders of Infants.—PROF. M. STOOSS, (Corr.-Bl. f. Schweizer Aerzte, Nov. 1, p. 665).

Teixeira de Mattos gives the following directions for the preparation of butter-milk as a food for infants:—To a litre of butter-milk a level tablespoonful of fine rice or wheaten-flour is added. The mixture is heated and constantly stirred until it has thrice been on the point of boiling over (for about 25 minutes). Two or three heaped tablespoonfuls (70 to 90 gm.) of cane or beet sugar are added. The utensils should not be made of any metal soluble in acids as butter-milk is acid. The writer follows these directions except that he adds less sugar (50 gm. of cane sugar). Heubner adds 60 gm. of sugar and one teaspoonful of fresh butter. The food is then poured into Soxhlet's flasks—one for each feed—and boiled for an additional three minutes. Butter-milk without the addition of flour consists of 2.5 to 2.7 per cent. of albumin, 0.5 to 1 per cent. of fat, and 3 to 3.5 per cent. of sugar. In the writer's hands Teixeira de Mattos' mixture has proved of special service in cases of infantile atrophy resulting from chronic dyspepsia, in which there is no intestinal irritation. If diarrhœa alternates with constipation it is occasionally useful in the latter periods, but is harmful in cases of acute diarrhea and vomiting. Great cleanliness is necessary in its preparation and the ordinary products of the dairies are dangerous.

Case 1.—A male child of prosperous parents weighed at birth 3,640 gm. It was fed on cow's milk, which agreed at first. Later there was constipation, and though various infants' foods were tried there was progressive emaciation. At 4 months the weight was 3,215 gm. Six feeds, each of 100 and later of 120 gm. of butter-milk, were given daily. The bowels at once acted normally. Except during 10 days when there was diarrhœa the diet was continued until June 23, when cow's milk was gradually substituted. The weight was then 5,410 gm. On July 15 it was 6,500 gm. Though in the first 4 months after birth weight was lost, in the second it was doubled.

Case 2.—A female child at 9 months weighed only 3,640 gm. At 9 weeks, owing to an attack of diarrhœa and vomiting, the weight fell from 4,000 to 3,500 gm. Subsequently wet-nurses and foods were frequently changed, but none agreed. The weight remained about the same, and there was constant vomiting, which was unrelieved by gastric irritation, and constipation, which yielded only to repeated enemata. On June 3 butter-milk (120 gm. in each feed) was gradually substituted for the infants' food which was previously given. The feces rapidly became normal, the bowels acted naturally, and on July 20 the weight was 5,050 gm. Cow's milk was then given with excellent results.

Case 3.—A child, aged 26 months, weighed only 4,275 gm. It had been fed with a variety of milks (including goats') and foods, but none agreed. On admission to hospital on Dec. 7 it was of about the size of a six month-old baby and scarcely more intelligent. Until Feb. 17 there was no improvement. Numerous furuncles developed, and there was slight pyrexia. But on the administration of butter-milk rapid improvement occurred. There were two attacks of convulsions, but on Mar. 29 the general condition was good and the weight 6,120 gm.

Case 4.—In this case there were chronic intestinal catarrh with offensive undigested stools and catarrhal bronchitis. Buttermilk was given during an interval free from diarrhœa, and produced such rapid improvement that other food was subsequently well borne and digested. The child, aged 15 weeks, weighed 2,930 gm. There had been diarrhœa since birth, which was premature, and later vomiting and cough. There was typical infantile atrophy. On admission the feces were pultaceous but moderately digested. There was then an acute attack of diarrhœa with offensive stools, and the weight sank to 2,660 gm. on Sept. 15. On Oct. 15 there was no improvement. There was catarrhal bronchitis, and the temperature was 100.6°. The stools were more formed, but contained more undigested lumps. The weight was 2,860 gm. Butter-milk was cautiously given, at first 2 feeds of 100 gm. daily and later 5 feeds each of 150 gm. with oaten-water. After Oct. 31 the temperature became normal and the weight rapidly increased. On Nov. 24 it was 3,440 gm., and on Dec. 2, 3,660 gm. The child was fed exclusively on butter-milk, and was discharged on Jan. 19 weighing 4,120 gm. At home cow's milk was given and was well borne, the weight increasing in one month by 2,000 gm.

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ORIGINAL ARTICLES

A STUDY OF CHOREA MINOR.

WITH ANALYSIS OF 173 CASE REPORTS OF PATIENTS TREATED AT THE ROYAL VICTORIA HOSPITAL, MONTREAL.

By Robert King, M.D., Montreal.

The various choreas and pseudochoreas are treated in myriads of articles in many languages. The accounts in text books and systems of medicine are full and exact to the limit of modern knowledge. Chorea minor is sufficiently common and striking in its manifestations to attract early the attention of the medical student, and in his third year he is well read on the subject, and better satisfied with his knowledge of the affection than he may ever be again. Later he delves deeper and find that the primary cause is unknown, that the pathology is disputed, and that the treatment is unsatisfactory.

It is with the chorea minor of Sydenham alone that this paper has to do, and no attempt at complete elucidation of the subject will be made. For a history of the evolution of our knowledge of the affection, and for its relation or rather lack of relation to the other choreas, the reader is referred to Dr. Osler's very complete monograph, published at Philadelphia in 1894, and from the same source, or from any modern work on medicine, may be obtained a systematic account of the disease. The object of this writing is, without attempting deduction or argument, to add in concise form to the mass of statistics already available, and the writer is satisfied to leave the interprtation thereof to the seers and prophets of medicine.

The list includes 119 ward cases with full reports, and 54 cases from the out-patient clinic in nervous diseases, necessarily incomplete. Results are given in percentages, and, for the most part, concern the ward cases only. An attempt has been made to eliminate errors by exclusion of variations evidently due to complications.

Chorea is of fairly frequent occurrence in Montreal. The hospital records show one case of chorea to three or four of acute rheumatism. An average of fifteen cases a year, about 1¾ per cent. of the medical cases, have been treated at the Royal Victoria Hospital since its foundation. Very young children are not often affected, or the movements pass unnoticed. There were no patients under four years of age: two were four, two, five. Holt, of New York, has not had a case under four years. In Osler's series of 522 cases, however, 18, or nearly 3½ per cent., were four years old or younger. Chorea may well be considered a disease of school life, or at least of school age, 78.2 per cent. of the present series, over 84 per cent. of Osler's, and nearly 96 per cent. of Holt's cases occurring between the ages of 6 and 15. Ten patients in my series were over twenty years of age; the oldest was a machinist, aged twenty-seven. Osler has thirteen cases over twenty, and of these two were over forty years of age.

Nearly three-quarters of the cases, 73.2 per cent., were females: the preponderance, common to all ages, is vastly greater during the years of puberty. Seven-tenths, 69.2 per cent., were school children, and next in order came housework, with 16.6 per cent.; 84.5 per cent. were Canadian born.

The influence of season on the incidence of chorea is well established, and a chorea tracing for the year shows fairly constant fluctuations, varied probably by differences of weather and climate. Morris J. Lewis, of Philadelphia, has analyzed 717 separate attacks of chorea as regards month of onset, and I find that the curve of the Montreal cases agrees with his in form, and that the highest point in each is reached in March. Thereafter, however, while corresponding rises and falls occur, the months of occurrence do not correspond. Both show a slight fall in April, to rise again in Philadelphia cases in May, and in the Montreal cases in June and July. The lowest point in the Philadelphia series is reached in November, and in the Montreal series in December. The Montreal curve rises gradually through February; the Philadelphia tracing shoots abruptly to its highest point in

March. The differences between the curves are less striking than their remarkable similarity.

The association of arthritis with chorea has long been recognized. An English writer, in 1802, gives rheumatism as a cause of chorea, and another, a little later, states that "chorea sometimes alternates with acute rheumatism." A French physician, in 1850, concludes, that of two rheumatic infants, one, at least, will be choreic, and of five choreic children, two are rheumatic. Another French writer of the same period states that articular rheumatism, chorea, and endocarditis are three terms of one and the same pathological state. The Collective Investigation of the British Medical Association shows that a little more than 22 per cent, of cases of chorea have a rheumatic history, and with this the largest collected American statistics closely agree. Jacobi strongly favors the view of the close relationship of the two affections, and Holt says that a large group of cases may be classed distinctly as rheumatic chorea. On the other hand, the earlier German writers and many Americans lay little stress on the occurrence of rheumatic pains with chorea, and find the percentage of cases in which such association occurs very small. Steiner, of Prague, found only four instances of acute arthritis in 252 cases of chorea. Of 144 cases in which careful inquiries were personally made by Osler, 25, 17 per cent., had had articular pains or swellings, but only six of these had had acute inflammation of joints. In this connection Osler calls attention to the frequently mild character of articular manifestations of rheumatism in childhood, so that the disease may be entirely overlooked until attention is called to it by cardiac complications. Holt regards endocarditis occurring in chorea as a manifestation of rheumatism. The Royal Victoria Hospital reports class chorea among nervous diseases, but, in the wards, its association with the rheumatic group is recognized and emphasized both in teaching and treatment. Of the Montreal cases 22.6 per cent. gave a history of rheumatism, corresponding closely with the over 22 per cent. of the Collective Investigation of the British Medical Association. In 10.4 per cent. of the cases the attack of chorea was preceded by joint pains and swellings, which nearly always passed away when the choreic movements began. This alteration or, as it were, antagonism of chorea and arthritis, the tendency to become manifest at different times, has been recognized and especially insisted on by French writers. In 9.6 per cent. of the present series, however, the choreic attack was accompanied by rheumatic pains. Rheumatism followed chorea in some cases, but statistics from chorea reports in that regard would be misleading, as pains might develop after patients left the hospital cured of the chorea.

In regard to the other members of the rheumatic group, there was a history of tonsillitis in 12.2 per cent. of the cases, but tonsillitis as a complication was not more frequent than in other diseases. Endocarditis was alarmingly frequent: it was fairly well established in 69.6 per cent. of the cases and possible in six other cases. An apical, systolic murmur, transmitted toward the axilla and persistent on repeated examinations, was held, in doubtful cases, to indicate lesion of the mitral valve.

Osler states that there is no disease, not excepting rheumatism, with which endocarditis is so frequently associated. His examination of 140 cases, more than two years after an attack of chorea, showed in 72 signs of organic heart disease. Dana, on the other hand, in his series of 318 cases found endocarditis in 10 per cent. only. The endocarditis is almost invariably of the simple or warty form, but dangerous from the sclerotic changes likely to follow in the valves. The following case illustrates the serious nature of the heart lesions which may follow chorea:

MALIGNANT ENDOCARDITIS FOLLOWING CHOREA PARALYTICA.

J. B., female, aged 13. At five years of age this patient had subacute rheumatism, followed by chorea, and mitral regurgitation was found by Dr. Osler. There were, subsequently, two other mild attacks of chorea. There was no further rheumatism and no tonsillitis. The child appeared robust and was very fond of gymnastics. Her fatal illness began with weakness of the right arm and leg, with slight irregular movements. The condition was pronounced chorea paralytica by Dr. James Stewart. After a fortnight power gradually returned, but slight twitching movements were noticed for three weeks longer. During this time an attack of subacute rheumatism supervened; knees, ankles, and elbows were painful on movement and slightly swollen, but the temperature was never more than one degree above normal. The joint trouble gradually subsided, and had altogether disappeared, when the temperature took on a septic type with rigors, sweating and weakness, rapidly progressive. A blood culture gave pure staphylococci. Patient died three weeks later. The diagnosis was malignant endocarditis, purpura hemorrhagica, acute nephritis, cerebral embolism.

Scarlet fever is placed with rheumatism by many writers as frequently preceding chorea; there are three such cases in this series. Chorea followed tphoid fever, mumps, and influenza in one case each.

For two-thirds of the cases no cause was assigned. The psychical element is evident from the frequency of fright, worry, or excitement as an inciting cause—15.7 per cent. of cases. There is very slight evidence in support of reflex irritation as a cause; eye-strain was associated in two cases, and pinworms in one. The influence of heredity and predisposition is well shown; 17.4 per cent. of the cases gave a family history of chorea, 26.1 per cent. of them rheumatism. Thirty-seven per cent. of the patients had previously had chorea; ten had had two previous attacks; eight, three; four, four; and six, several.

The left side was attacked more frequently than the right, contrary to rule but not to reason, for the left side in most people is less developed and less under control than the right. There were five cases of left hemichorea, three of right. In 28.7 per cent. of cases the left side was more affected, as compared with 22.6 for the right. In half the cases no difference between the two sides was noted. Weakness of the affected parts was mentioned in one-quarter, 24.4 per cent. of the cases; one case of chorea paralytica occurred. Speech was affected in 30.4 per cent. of the cases. There were movements during sleep in 4.3 per cent.

Sensory disturbances occurred in 4.3 per cent. of the cases and were slight.

The superficial reflexes were increased in 11.3 per cent. of the cases; the knee jerk in 30.4 per cent.; the latter was diminished in three cases, and absent in one; in two cases the patellar reflex had the halting character said to be peculiar to chorea.

Irritability is mentioned as a feature in one-third of the cases. Two cases of chorea insaniens occurred; both patients recovered.

CHOREA INSANIENS: RECOVERY.

P. S., female, aged 17. This patient lived at home and was occupied with housework. She had had a former mild attack of chorea, but had not had rheumatism. There was a family history of chorea. A quarrel with a friend was given as an inciting cause of the present illness. The attack began with movements in the right hand, gradually becoming general. There was no mental disturbance for three weeks, then intensification of symptoms with sudden change of disposition. On admission patient was well nourished and of good color. There were constant general choreic movements. She would answer no questions, and resisted examination. The mental attitude was that of a spoiled child of three or four years. The reflexes were greatly increased. There was slight mitral leakage. For the first few days patient hardly slept at all. Later she developed well-marked hallucinations and delusions. At times she was violent. The movements continued during sleep, and she had involuntary passage of urine and feces. The highest temperature recorded was 101.4, with corresponding pulse and respirations. She was in the hospital a month and was discharged cured.

CHOREA INSANIENS WITH HYSTERICAL SYMPTOMS, AND WITHOUT HEART LESIONS: IMPROVEMENT.

B. S., female, aged 16. This patient had been nervous but healthy. She had not had rheumatism. It was first noticed that she became childish, irritable, and impatient. Stiffness of the right hand followed. She complained of a ball rising in her throat and choking her, and had attacks of crying and laughing. Two weeks later movements became general, and definite mania with delusions and hallucinations followed.

On admission patient was found fairly well nourished. She was constantly in motion, tossing herself all over the bed. The heart was extremely irregular in rhythm, but otherwise appeared normal. The mental state was one of abnormal excitement. She held her scapular tightly in her hands, saying that devils were tempting her to let it go, and that if she were to drop it they would run away with her. She stated that everything in the room looked blue. She cried spasmodically, and, if not restrained, would get out of bed, stagger a short distance, and fall in a heap on the floor. She usually answered questions asked her by her relatives. The knee-jerks were active. The attacks of mania continued during the time she was in the hospital, but there was marked improvement and the choreic movements ceased. The heart did not become involved and the urine was always normal. She was removed by her friends and was lost sight of.

Except in the maniacal type, and in cases with complications, fluctuations of temperature in chorea are slight. The maximum temperature in uncomplicated cases was 101.4 deg.; the minimum, 95.3 deg. The average maximum was 99.4 deg.; the minimum, 97 deg.

Of complications, endocarditis, as already stated, was present in 69.6 per cent. of cases. Pericarditis was noted only once. Functional murmurs occurred in 13 per cent. of cases. Tonsillitis was not more common than among other patients; it occurred four times. Anemia is mentioned as a marked feautre in 19.9 per cent. of the cases; it is of chlorotic type, and in three cases the hemoglobin finding was 55 per cent., 60 per cent., and 77 per cent. Skin eruptions, of which herpes was most frequent, were found in 11.3 per cent. of cases: a little less than half the rashes might be regarded as rheumatic. There was not definite acute nephritis in any case. Albumen was found in two cases and a trace of albumen in fifteen others. A few casts were found in five cases. Sugar was never found.

The following two cases are in the hospital at the time of the present writing. The first supports the view that chorea is an infectious disease allied to rheumatism; in the second the psychical and nervous elements are strongly emphasized.

CHOREA WITH SUBCUTANEOUS NODULES.

B. W., female, aged 8. This patient was born in Germany and has been only eight months in Canada. She had tonsillitis three years ago and has had no other disease. The family history is good. The present illness began two months ago with otitis media, followed by joint pains and sore throat. Then followed movements in the left arm, left leg, and face. Speech was affected. On admission, patient was well nourished. The heart showed mitral stenosis and regurgitation. There was soreness of the joints, and subcutaneous nodules, attached to underlying structures, but not to the skin. The nodules appeared with the onset of the joint pains, first about the ankles, then on the hands and head, in some places in chains, elsewhere irregularly. They remained about a fortnight, were never very hard, and were not tender. Very marked paresis of the left side developed after admission to the hospital; this now shows considerable improvement. There has been no mental disturbance.

INTRACTABLE CHOREA WITH IMPISHNESS.

P. V., male, aged 14. This boy is small for his age, of fair nutrition and not anemic. He is a tailor by trade. He had left hemichorea a year ago with marked psychical features. At present there are general movements, somewhat lessened by effort. Patient can hold a glass and drink from it fairly well. There is mitral leakage. The reflexes are active. Patient is very emotional and impish in his actions. He cries and at times causes much disturbance in the ward. He plays pranks, and is a trouble to the nurses and an annoyance to other patients. Improvement is slow.

As regards prognosis in chorea, over 70 per cent. of the ward cases were discharged cured; 26.1 per cent. were improved. Two patients died, both from complications. The average duration of the disease, for 70 cases, was 87 days; the average stay in the wards, for 113 cases, was 37 days.

Treatment.—In the wards 70 per cent, of the cases were cured; 26 per cent. improved. In the out-patient department one was marked cured to seven improved. Allowing for the imperfection of out-patient records, the influence of rest and isolation from friends is evident. It does not appear that there is danger to other children from association with choreics. In one report it is stated that a convalescent choreic again developed movements when another choreic in the acute stage was placed near him in the ward. There is no record of any other patient having been affected in any way by the proximity of a choreic. In 8.7 per cent. of the cases no medicine was used, but these were mild cases. Of drugs, arsenic was given in 75.7 per cent. of the ward, and 68 per cent. of the out-patient cases. Of late, in recognition of the frequent association of arthritis, sodium salicylate has been frequently used. The comparatively small number of cases, 9.6 per cent., so treated, and the uncertain course of the disease would render present comparison misleading, but it cannot be said that in any case marked improvement followed its use. Iron was used in a few of the ward cases, and in 24 per cent. of the out-patient cases. In one case apomorphine was found to quiet the patient when the more usual forms of treatment had failed.

In conclusion, the following statements are suggested for consideration:

1. Chorea minor is a functional nervous disturbance of unknown origin.

2. In many cases it shows evidences of infectious character, and of close association with rheumatism.

3. Heart lesions occur frequently and often seriously affect the prognosis.

4. Medical treatment is uncertain; early diagnosis and prevention of recurrence important.

THE EARLY USE OF SOLID FOODS IN ARTIFICIALLY FED INFANTS.

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The recent article in Pediatrics by Dr. D. E. English, of New Jersey, on "The Other Side of Infant Feeding," has called the attention of the medical profession to facts which need to be noted. 'Tis true that hundreds of monographs have been written upon this subject, and grand work has been accomplished along the line of infant feeding, but it has been on the side of the food, and not enough attention has been given to the baby. While excellent results have already been accomplished by proper preparation and modification of the food, may we not be able still further to decrease mortality and improve the condition of the infant by closer observation of the physiology of digestion and development of the digestive organs of the infant.

Physiology teaches that muscular development depends upon muscular exercise. The stomach being largely a muscular organ, its development depends upon the right kind of stimulus. The glands of this organ must be stimulated with the right kind of food in order that they may be properly developed. An infant that has been fed upon a peptonized food for too great a length of time, has an atrophic condition developed in the peptic glands.

After seeing many healthy, robust infants under 12 months of age, who have been allowed, by indulgent parents, to satisfy their appetites at the table, it has led me to think and experiment along this line, until I have arrived at the conclusion that the recommendations of nearly all of our writers are erroneous, and the earlier use of solid foods should be practiced among artificially fed children in order to obtain the best results in the health, growth and development of the infant. I firmly believe in educating and developing the digestive organs of the infant so that such foods as are allowed by many writers at the age of 12 months may be used at six, accomplishing better results toward growth and development.

Upon examining a number of authorities, including J. Lewis Smith, Holt, Koplik, Rotch, etc., I find it is from the 8th to the 12th month before any starchy foods are allowed, many contending for this late period because the infants do not possess the necessary secretion of fluids for digesting starchy articles. Schiffer, Koron and Zweifel have proven that infants from birth can transform small amounts of starch into sugar by the action of saliva. Beginning with the fourth week the pancreatic secretion also possesses diastatic properties. The conversion of starch into sugar is a process of gradual development and education on the part of the digestive organs. If the right kind of stimulus be supplied the digestive organs will gradually respond to the demand until it will be possible for the infant to digest foods which contain a considerable quantity of starch at a much earlier age than has been thought possible.

In the use of modified milk as devised by Rotch, of Boston, this form of feeding is continued to the age of 12 months. He then allows the infant unmodified cow's milk. At the 10th or 11th month Rotch usually begins to give one and then two meals daily of oat jelly and plain milk, pasteurized at 68°C, equal parts with a pinch of salt to suit the taste. Barley or wheat may also be used. In the 12th month he accustoms the infant to taking bread (one day old) and to eat with a spoon, so that at one year of age, it takes bread and milk for breakfast and supper, and oat jelly and milk for the three middle meals.

Koplik in his work on *Diseases of Infancy and Childhood,* commences from the 9th to the 12th month, in both breast and bottle-fed infants to give cereals in the shape of pap, barley or crackers twice daily, or an ounce of expressed beef juice, with barley, once per day.

All authorities upon infant feeding recommend various milk dilutions, etc., and are extremely slow about allowing solid food. Their reason seems to be based largely upon physiological teachings, viz., that the starches cannot be converted into sugar during the early months, consequently any food containing starch should be prohibited. If the right kind of stimulus be supplied the digestive organs will respond to the demand until it will be possible for the infant to digest foods which contain a considerable quantity of starch. Instead of waiting until the infant is 12 months old, they can be taught to digest these foods at 6. In the different forms of milk modifications which we are compelled to use in the early stages of infancy, the use of some starch is beneficial, because it helps to separate the solid curds formed by the milk, through mechanical agency. In addition to this the milk supply obtained by a large majority of infants who are artificially fed. both in town and country, is subject to milk contamination. In country districts, while the milk contains all the necessary solid constituents it is rarely if ever free from contamination, and is usually too rich.

Percentage feeding after Rotch can only be obtained in the larger cities, and only among the wealthier classes (and they have but few children), hence methods which will bring the infant to the digestion of solid foods at a much earlier stage than usually taught, will be applicable to a large percentage of children who have to be artificially fed.

The plan usually adopted by me for educating and developing the digestive organs of the infant, so that the earliest use of solid foods can be made, consists in allowing foods which contain starchy elements. If the infant be fed upon condensed milk, modified cow's milk, or any of the patent preparations of foods, I first allow small quantities of acid juices, preferably pineapple juice, which at first should be in very limited quantities, next teach the infant to swallow, by using a few stale bread crumbs, or crumbs from soda cracker, then you can add small quantities of rice or barley water. You can next pass to milk and flour gravy, then on to oatmeal gruel to which some cream and sugar have been added. At the end of six months you will have the infant eating bread and gravy at the table, the ingredients being such as can be obtained by the poorest.

This milk and flour gravy is an ideal food for the infant just as soon as it can commence the digestion of starch. The fat used in frying the steak or bacon furnishes the element required in the food, the flour contains gluten and starch, adding both the nitrogenous and non-nitrogenous elements; the water dilutes the milk and the flour prevents coagulation, while the cooking renders the whole sterile, consequently it is an ideal food for early use.

In addition to the above plan, besides pineapple juice, you can begin the use of a small quantity of fruits, but they must be ripe and scraped with a knife so as to be perfectly soft, with no solid lumps for the infant to swallow. You can also use broths, veal, mutton or chicken, a mealy potato thoroughly boiled, well mashed and moistened with gravy.

By following the plan outlined, you have brought the digestive organs of the infant at the age of six months up to the point usually attained at the age of 10 or 12 months. Another important point to remember is not to feed too frequently. The stomach should be allowed time thoroughly to empty itself, so that there will be no particles of ferment left to contaminate new food. The recommendations of regular times of feeding and exact amounts necessary cannot be told to a certainty, and I think the better plan, as recommended by Dr. English is to allow the infant to become thoroughly hungry before feeding, then let it feed to satisfaction. This will allow the organ to contract and expand, giving that exercise which strengthens and develops both muscles and glands.

AMAUROTIC FAMILY IDIOCY.[1]

By Mortimer Frank, M.D.,

of Chicago, Ill.

This uncommon disease was first described by Warren Tay, an English oculist, in 1881, and recorded under different titles until Sachs proposed the name as now used.

Amaurotic family idiocy is a fatal disease, commencing in the early months of infant life, with muscular weakness progressing to almost complete paralysis, associated with a distinct symmetrical fundus appearance and terminating in death about the end of the second year. No definite exciting cause has been assigned. There is no evidence that inherited syphilis, consanguinity of parents, or any of the usual diatheses, is a factor. There is, however, a marked racial peculiarity. In 54 cases reported with histories, 27 cases occurred in Jews, 6 in Gentiles, and in 21 cases no parentage was given.

Both male and female children are affected. Of the reported cases, 22 were in males, 25 in females, and in 7 no sex was given. The child is born at full term, sound and healthy, and continues so until the third month. It then ceases to develop along normal lines, and signs of muscular enfeeblement, especially of the back of the neck, are observed, with failure of sight..

Should an ophthalmoscopic examination be made at this time, definite and characteristic changes in and about the macular region will be detected. In the beginning of the disease there is no change in the appearance of the discs, and the child is able to see. Later on there is optic atrophy and total amaurosis. The changes in the macula are always symmetrical and pathogomonic. About the macula is a nebulous area, grayish-white in color, slightly raised about the surface of the retina and about two or three times the size of the optic disc, with softened edges gradually blending with the normal fundus. The patch is somewhat oval in shape with the major axis horizontal. In its center, coinciding with the fovea centralis, but larger, is a dark red or liver-colored spot, clear-cut in outline. Surrounding the central spot can be seen distinctly the tiny retinal vessels. Strabismus and nystagmus have been observed. There is no recorded regularity as to the condition of the pupils. While perception of light is present for a time only, hearing remains hyper-acute, so much so that any sound causes the child to start. Marasmus increases slowly and the muscular enfeeblement becomes so pronounced that the child is unable to sit up and the head falls backward if unsupported. The temperature remains normal throughout the course of the disease.

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[1] Read before the Chicago Medical Society, Nov. 15, 1905.

The case reported was referred by Dr. A. C. Cotton. A female, aged one year, youngest of four children, of Jewish extraction, with no history of syphilis or consanguinity of parents. The child was breast-fed and the appearance and nutrition were good. The head was well-formed and of normal size. She was restless, unable to sit up, and apathetic and understood nothing. The reflexes were exaggerated, and especially noticeable was the abnormal susceptibility of the child to noises.

With reference to the ocular symptoms, the following is noted: The pupils were about 1½ mm. in diameter, equal in size, and reacted slowly to light. Light thrown into the eyes failed to give any evidence of vision. The discs were atrophic, grayish in color, with well-marked outlines. The fundus picture, as described, was typical. Up to the present writing the patient is still alive.

Dr. Alfred C. Cotton stated that he had reported three cases of amaurotic family idiocy. The first was reported some six years ago. In this case the diagnosis was confirmed by an ophthalmoscopic examination made by Dr. Westcott. In another case, observed two years later, the diagnosis was also confirmed by the same ophthalmologist and in the third case which he reported this summer before the meeting of the American Medical Association, the ocular findings were described by Dr. Mortimer Frank. He showed photographs of these patients.

The first patient, an infant of one year, was seen before any symptom or symptoms were noticed. Later, when the infant was 22 months of age, he was enabled to make a diagnosis of amaurotic family idiocy, about five months before death.

He passed around a picture of the sister of the infant of 22 months. This photograph was taken a week before death, and in this case a diagnosis of amaurotic family idiocy was also made. This case he reported at a meeting of the Chicago Pediatric Society a year ago.

The next photograph was one of the patients referred to in Dr.

Frank's paper. He saw this patient through the courtesy of Dr. R. A. Martin the first of last March. The child was one year old then, and a photograph was taken the following month. He showed another photograph of the same child which was taken at 17½ months. He saw this child a few days ago, it was living, and was now 20½ months old.

Occasionally, a case of amaurotic family idocy was probably correctly diagnosed before the eye findings were disclosed.

The question as to its being a distinct disease had been raised, and this deserved more than a passing notice on account of the group of symptoms manifested. The agenesis corticalis of Sachs had given way to the general concensus of opinion in regard to the condition as a degenerative process begining in the large ganglion cells of the grey matter, with secondary degeneration of the white matter of the nervous system.

According to the paper of Dr. Frank, there had been 74 cases of amaurotic family idiocy reported up to July of this year. At the time the speaker reported his first case, six years ago, there were then 36 cases on record. The fact that so many cases have been reported in the last six years showed that the profession were more alive to the symptom-complex of this disorder. In other words, some of the cases were overlooked prior to that time. This led him to believe that many cases of amaurotic family idiocy were overlooked to-day, since in many instances the symptoms were so obscure as to pass for blind idiocy, etc., and as the eyes were probably not examined, a correct diagnosis was not made. The disease was much more prevalent than we had been led to believe, and this being the case, amaurotic family idiocy was worthy of thorough and separate discussion.

As to the etiology, Hirsch, some eight years ago, ventured the suggestion that it was due to some toxin in the mother's milk. Sachs combatted this idea, and it was thought successfully at the time for the reason he stated that two of his cases were bottle-fed infants, so that the etiological theory of Hirsch was apparently laid on the shelf.

The tendency was to claim heredity as an etiological factor. The fact that most all of the cases reported were of Jewish parentage had been dwelt upon extensively. He thought if we could claim heredity for this disorder, we must remember that perhaps every second child in the family escaped the disease. While there was a family tendency in this disease, yet in a family of six children three only had amaurotic family idiocy, the other three escaping.

His attention was directed very early to the analysis of the mother's milk in these cases, and hence he had had opportunities for observing and analyzing the milk. In the cases that had been observed there was a paucity of fat in the mother's milk, as all of the children were breast-fed. In the same family, where two of the children to his certain knowledge escaped the disease, the mother's milk was fairly rich in fat. The role of lecithin in the development of fat cells led him to consider a deficiency of lecithin in the mother's milk. As bearing upon the etiological relationship, the thought occurred to him that the mother's milk contained a toxin. The idea also occurred to him that a child might develop amaurotic family idiocy that was fed on cow's milk. Whether we accepted the theory of amyotrophy advanced by Gowers, or the theory of degeneration of the nerve structures, which was Sachs' stand in regard to the pathology, the possibility of a deficiency in some constituent in the mother's milk should be considered. All of these children were declared normal at birth and even up to several months after birth. If it could be demonstrated that the children of parents in families where amaurotic family idiocy had cropped out by being fed on food with an increased supply of lecithin did better and their lives were prolonged, then he thought the theory of a paucity of lecithin was worthy of serious consideration.

Dr. Cotton mentioned one case in which life had been prolonged, although the child was in the advanced stage of the disease, by the addition to the diet of lecethin in half grain doses, five times a day.

Dr. L. Harrison Mettler stated that the etiology and pathology would seem to be distinct from the clinical presentation. In his judgment, in the clinical presentation he thought we were considering two diseases with similar clinical pictures. He believed there were many manifestations connected with amaurotic family idiocy, which were very similar to or corresponded to those of Sachs' disease. He referred to a pseudo-Sachs disease. He spoke of the racial tendency of the disease, and it was pointed out that a large number of the cases occurred in the Hebrew race. The symptoms of the disease made their appearance early in life in the majority of cases, in some at the eighth, tenth or twelfth month after birth, and these little patients died relatively early.

FEEDING SICK BABIES.

By I. A. Abt, M.D.,

CHICAGO, ILL.

I do not desire to speak slightingly of substitute feeding; nevertheless, I am continually impressed with the fact that the clinicians abroad have not felt the necessity of adopting the methods which we consider here in America the very best plan. They must be getting results from their plan of treatment or else they would not continue to use it. I doubt whether their morbidity or mortality is larger than ours. It would be of great interest if someone would make a comparative study of the various methods of infant feeding here and abroad.

In discussing the subject of feeding of babies sick with gastrointestinal disorders, it is necessary to refer to some classification of this group of disorders. We may speak first of those cases in which there are dyspepsias. Under this title the older authors included what our American authors call gastric and intestinal indigestion. Dyspepsia is considered a functional disorder. Food is undigested either on account of the increased quantity taken, or on account of the inability of the secretions to digest, or possibly on account of motor inactivity of the stomach, which is usually present in dyspepsias. The disease is not only gastric but gastrointestinal. These children vomit, they have, colic, they hiccough a great deal. They lose little in weight at first. This may last for a short time or for a long time; it may lead to gastrointestinal infections, or finally the baby becomes marantic.

These dyspepsias sometimes cause severe colic. The baby is sick; it shows undigested stools. It is either stationary in weight or is losing. Stationary weight in an infant is pathological, whereas in an adult it is physiological.

What shall we do for these dyspepsias? The dietetic treatment for the various gastrointestinal conditions, whether dyspepsias or infections, is very similar. Many babies are dyspeptic during the first days of life, first of all on account of the fact that the gastrointestinal tract is still in a primitive condition, not up to its highest function, and possibly the food is not fitted to the digestion of the child. Indigestions in early infancy are often serious and they should be properly managed from the start. I am sure we may charge many gastrointestinal disorders of infancy to some great error during the infant's first days of life. Frequently the nurse who has charge of the infant's food gives a very strong and not well diluted milk or cream, or, if the baby is not doing well she keeps it at the breast nursing at short intervals, where perhaps a little dietetic treatment and good management would allow the baby to develop its natural digestive function. These sick infants usually need some laxative at the same time the dietetic treatment is begun. I think it is an error that is commonly made to continue too long the administration of calomel or any other cathartic drug. The long continued use of laxatives acts as a gastrointestinal irritant, with thin mucous stools, and abnormally increased intestinal peristalsis. After the desired effect of the laxative has been obtained, it should be stopped.

Concerning the dietetic treatment, which is, of course, the most important of these conditions, the one essential principle to be recognzed and praticed is to give the infant's digestive organs a rest, whether in newly born or more mature infants. Perhaps the best plan is to give a little plain water every two hours, and continue this for 24 or 48 hours. The Germans give tea; somebody else gives barley water; it makes little or no difference, the underlying principle should be to give a bland, non-irritating liquid requiring little or no digestion.

What shall we do after this dietetic treatment has been carried out? If a breast baby, it should be put back on the breast; it should be given a small quantity at first and the intervals between feedings should be prolonged, so that one can see how the digestion is. If the child is to be fed artificially, the feeding should be begun in the same way, small quantities of milk at long intervals.

The acute gastrointestinal infections begin suddenly or after an indigestion, or at times they are secondary to other infectious diseases. The gastrointestinal infections are usually associated with fever, rapid respirations, rapid pulse, intestinal colic, frequent stools and as a rule the stools are watery, and are forcibly ejected with a discharge of gas. The child frequently shows signs of a general infection or a constitutional illness. These children lose in weight very soon. These are perhaps the most serious and difficult cases to treat.. What shall be done with these babies? Medicinally, the same as has already been indicated. The dietetic treatment is similar to that which has already been outlined; put the baby on a bland, non-irritating diet which practically requires no digestion.

The next point is, how shall we feed these babies after the signs of acute illness have disappeared? A good deal depends upon the age of the child. I have a history sheet in my book that is of interest in the matter of feeding babies who have apparently recovered from acute gastrointestinal affections.

The baby was admitted to our ward the 13th of this (November) month. It was four months old, had mild hydrocephalus, for which reason it entered the hospital. It had intestinal infection which became apparent from the examination and history. The temperature was 101°, which fell to 97° and remained normal after two or three days. The resident physician thought the baby had recovered after being on barley water for a few days, and at once gave it milk, the formula of which was 2½ per cent. fat, 1 per cent. proteid, and 6 per cent. sugar. No sooner did he go on the milk than the temperature rose to 101.6° after having been 99.8°, and continued at 101.6°, the respirations became rapid, the abdomen became unusually tympanitic, the child showed great prostration, and died as the result of a relapse of the gastrointestinal infection. What does that mean? Simply that the child was given milk too soon; the gastrointestinal tract had not been entirely cleared of the infectious material; the milk served as a pabulum for infection, severe toxemic symptoms followed, and death was the result. The point is that the very difficult problem in the acute cases is how to begin the feeding after the patient has apparently recovered from the attack. What shall you do? Two horns of a dilemma present themselves. Shall you underfeed or poison the patient? In most cases you need do neither. These babies may be given first of all barley water, or if you please, they may be given some malted food. For the next few days there may be added, if the child is without temperature and the stools improve, some egg white, or, if things seem promising, whey may be added. There may be valid objections to the use of whey shortly after intestinal infections. If the milk contains bacteria, surely the whey contains them, and for this reason it is well to heat the whey to 150 or 160 degrees F.

Having gone thus far, if we have brought the baby safely to the starting point where the stools are improved, and the child seems better, then I believe one may begin with small quantities of milk, whether it be given in the form of a formula stated in percentages, or whether by the teaspoonful, it should be given in small quantities. I believe it is well, particularly at the start, to give skimmed milk. I think the rule is that fat, i. e., cream is poorly borne by these individuals, and if you want to tide them over, give low percentages of fat. Give these children skimmed milk in small and increasing quantites, either sterilized or fresh. It is perhaps better, for the first few days at least, to scald the milk. At the end of a short time one may resume the use of the milk formula, remembering, however, the caution that an infant should be given no more milk than he can digest. It is an axiom that a safe and speedy digestion is well nigh proof against gastro-intestinal infection.

That leads me to speak of one other condition—i.e., marasmus. We have noted that it is liable to be the end result of the protracted indigestions. It is well known that marasmus may be due to tuberculosis, syphilis, or other acute or chronic infection. We refer to those cases which are of intestinal origin.

What is the cause of marasmus? All the theories as to its cause are interesting because they throw some light on this question of over-fat-feeding. One of the early theories was that the condition was due to the tabes mesenterica; that the glands occluded the lymph vessels and the flow of chyle was intereferd with, and for this reason the food which the children ate did not nourish them. But Parrot contended that the condition was due to an atrophy of the gastrointestinal mucosa. The cells of the gastric and intestinal mucosa atrophy, he said, and lose their function. Others corroborated that view. Fenwick, for example, in England, after a study of these cases corroborated this view. Baginsky thought the condition was due to gastrointestinal atrophy. Others have said that the histological studies of gastrointestinal mucosa were not to be credited on account of the rapidity with which post-mortem changes in gastrointestinal mucosa occur. The theory which is attracting most attention at this time, is that of acid intoxication due to over-fat feeding. Czerny, Kellar, Langstein and a host of others have taught that excessive indigestion of fat brings about an internal excess of acid, and they attempt to prove it. They show there is an increased quantity of ammonia excreted. This they say indicates that the economy is deprived of its alkali or neutralizing material, and consequently there is retained an excess of acid. This excess of acid occurs because fat is used in excessive quantities. It has also been shown that there is an increase of the phosphoric acid eliminated in the urine. In these cases where excess of fat has been given the stools are a combination of fatty acid with an alkali forming a coat. Not long ago, you all remember, Holt, of New York, read an interesting paper in which he said many of the cases of acute gastrointestinal indigestion or infection he saw were due to excessive use of fat. Another clinical side is that in Breslau, Czerny showed that if he fed Liebig's malt soup, which is low in fat, he obtained better results than if he used foods containing high fat percentages. The point is this, that during a condition of health a large amount of fat may cause no deleterious results; more particularly, frequently children who have been in perfect health are upset by milk mixtures too rich in fat, or in cases where children are recovering from acute illness, it is better by far to give low fats. This may be done best by using skimmed milk during the period of fat abstinence.

About the treatment of marasmus itself little can be said. These children do badly under almost any plan, particularly in institutions. They may sometimes be tided along until their digestion returns; they should be given diluted milk mixtures. Salge, of Berlin, says these children digest fat so poorly that he placed them on centrifugated mother's milk. In this way he eliminated the cream and fed them on skimmed mother's milk.

Another point about marasmus or protracted gastrointestinal cases, is that some of these children will do well on buttermilk. There is no doubt that some marantic infants fed on buttermilk, which has been properly prepared, make favorable progress.

There is one other point I should like to refer to briefly. I am reminded of twins 10 months old that I treated this summer. There is quite a difference between treating 10 months' old and 2 months' old babies, particularly as to the variety of foods we may give. These babies had suffered from four to six weeks with gastrointestinal disorders, sometimes acute with fever, sometimes with bad stools and vomiting without fever. They had been given various kinds of milk mixtures without success. Finally, we took away the milk altogther and gave them broths in which vegetables had been cooked, but strained out, then some zweibach prepared with a rolling pin, and a little cracker, small quantities of beef-juice, and a malted food. These children got along without loss of weight until finally we gave them condensed milk, and after a few days unboiled skimmed milk, until now they are back on milk formulæ, and are slowly regaining their weight and strength.

The point I would make is that in older children, who have already two to four teeth, I think one may in the desperate cases cut loose entirely from milk. There is no harm in giving the animal broths, especially when the milk cannot be digested. Steffen years ago fed young infants on veal broth, with milk. He thought then, as many have thought since, that he had found a solution of infant feeding.

THE COINCIDENCE OF DISEASES[1]

By Edmund Cautley, M. D., Cantab., F.R.C.P., Lond.,

PHYSICIAN TO THE BELGRAVE HOSPITAL FOR CHILDREN AND TO THE METROPOLITAN HOSPITAL.

The coincidence and interaction of diseases rarely receive due attention. Consequently errors in diagnosis, treatment, and prognosis are not uncommon, for the difficulties are greatly increased, especially when the concurrence is unsuspected. Acute diseases may be coincident and run their course without influencing each other to a recognizable extent. The total effect on the patient is usually one of increased severity of the illness. Thus, the concurrence of measles and diphtheria in the very young is almost invariably fatal. Such cases have been recorded, and the laryngeal obstruction due to the diphtheria is very liable to be mistaken for that of the laryngitis of measles. Measles has been reported concurrent with scarlet fever and with varicella, and scarlet fever with smallpox. Typhoid fever and paratyphoid have also been found in conjunction in cases to which I referred in a paper on paratyphoid fever in the June number of this Journal. Of the latter association I now record two more instances. The coincidence of acute anterior poliomyelitis and diphteritic paralysis is undoubtedly rare and illustrates the difficulty of diagnosis and prognosis. The association of tuberculous meningitis with the presence of the Diplococcus intracellularis of Weichselbaum indicates the danger of basing a prognosis on the results of bacteriological examination of the cerebro-spinal fluid obtained by lumbar puncture, and suggests that in some instances the diplococcal infection may be a terminal one in the course of other diseases.

A more common coincidence of disease is that of acute illness in a patient affected by a chronic one, modifying its course and duration. The beneficial effect of an attack of erysipelas on new growths, lupus, chronic eczema, and chronic ulcers, has often attracted attention. Some observers have found that vaccination with calf lymph modifies whooping cough and renders it comparatively harmless. Others have noted that it sometimes has a beneficial effect on eczema and chronic skin affections. Such effects suggest wide possibilities in the treatment of disease.

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[1] *British Journal of Children's Diseases.*

TYPHOID *plus* PARATYPHOID FEVER.

Case 1.—A girl, aged 7 years, was admitted to the Metropolitan Hospital under my care on July the 3rd, 1905. A sister had died one month previously in another hospital from "enteric fever." Patient was taken ill with headache, drowsiness and fever on June the 19th. On the 21st she complained of stomach-ache and took to her bed. She had no epistaxis or diarrhea. On admission she was pale, had a slight cough, and a dry, furred tongue. No bronchitic sounds were heard in the lungs. There was no abdominal distension. The spleen was large and easily felt. Numerous rose spots were scattered all over the trunk. The temperature was 103°F.

The course was that of a mild attack of typhoid fever, with constipation throughout. The defervescence was gradual, the temperature remaining down after July the 9th. Convalescence was uninterrupted.

A blood examination on July the 11th gave a positive Widal reaction in ten minutes, with a dilution of 1 in 30, and a positive reaction with the paratyphoid *a* organism in the same time and with the same dilution.

Case 2.—The mother of the above child was admitted on July the 6th. She was aged 31 years, careworn and thin, and much more seriously ill. Headache and abdominal pain began on June the 16th, and she had remained in bed until a few days before admission. Constipation had been present since the first two days of illness.

A few scattered rose spots were found. The abdomen was tender on palpation and the splenic dulness was enlarged. Nothing abnormal was found in the chest. Pulse 120; temperature 101.4° F.

A blood examination on the next day gave a positive Widal reaction in ten minutes with a dilution of 1 in 25, and a positive reaction with the paratyphoid *a* organism in twenty minutes with the same dilution. This was verified by a second test.

On July the 10th fresh spots were found and a cloud of albumen in the urine. The temperature had ranged between 102°F and 104° F.

On July the 13th there were still more spots, rather dry tongue, and loose stools, with a small blood-clot in one. She was distinctly worse, restless, and rather tremulous. The temperature had been from one to two degrees higher since the previous day, and the respiration rate more frequent. On examining her chest the left lower lobe was found to be consolidated. No definite onset of the pneumonia was noted.

On July the 15th she was distinctly weaker and more tremulous. In the afternoon she had two rigors, followed by great feebleness of the pulse and rapid respiration. She got steadily worse and died the following morning.

Unfortunately an autopsy was not obtained. No definite cause for the rigors was found, but the occurrence of the pneumonia and rigors is strongly suggestive of a general blood infection, such as is found in cases of paratyphoid fever. The continued eruption of spots is also in favor of this view.

TUBERCULOUS *plus* CEREBRO-SPINAL MENINGITIS.

Case 3.—A boy, aged 3 years, was admitted into the Metropolitan Hospital under my care on June the 24th, 1905. He was one of seven living children. Nine others had died in infancy. There was no history of phthisis in the family. He was breast-fed in infancy and had had no illness until the last month, during which he had attended as an out-patient for cervical adenitis.

His present illness began on June the 14th, with headache, and since then he had been ailing and listless. He vomited on the 16th. No constipation had been noted.

On admission he was well-nourished, not rachitic, drowsy, and irritable. The tongue was furred and the knee-jerks active. On June the 26th there was slight fever, irregular pulse, and anorexia; tâche cérébrale, active knee-jerks, no retraction of head or abdomen, and no rigidity of the neck muscles. The percussion note was a little impaired over the second right interspace near the sternum. On June the 28th he was more drowsy, had incontinence of urine and occasional squint.

Next day the head and abdomen were retracted, the pupils dilated, and he was partially unconscious. Kernig's sign was present. He was nasal-fed. On the following morning he had a fit. He remained much the same until July the 3rd, when he had more fits, became stuporous, and exhibited squint, unequal pupils, rigidity of the legs, a pulse rate of 144 and Cheyne-Stokes' breathing. He got steadily worse and died on July the 5th. Constipation was present from the time of admission. The temperature kept low until the last 48 hours of life, when it ranged from 100° F to 102° F.

Lumbar puncture.—Five drachms of clear fluid were withdrawn on July the 3rd. The diplococcus was present in clear culture and grew freely on blood-agar.

The autopsy showed much cloudy fluid and lymph at the base of the brain, with miliary tubercles scattered about in the common situations, and considerable hydrocephalus; tuberculous consolidation of the lower part of the right upper lobe; caseous glands at the roots of the lung and bifurcation of the trachea; tubercles throughout the spleen, and subperitoneal tubercles on the liver. The mesenteric glands were not caseous.

ACUTE ANTERIOR POLIOMYELITIS *plus* DIPHTHERITIC PARALYSIS.

The occurrence of anterior poliomyelitis shortly after an attack of diphtheria may lead to the palsy being ascribed to the diphtheria and consequently an unduly favorable prognosis.

A boy, aged 16 months on admission into the Metropolitan Hospital on November the 5th, 1904, illustrates this difficulty.

On October the 17th he attended as an out-patient for loss of voice. He did not seem ill and the aphonia was ascribed to a mild attack of laryngitis. He went on quite well until November 1st, when he began to vomit. Two days later he had difficulty in swallowing and the same night had a fit. On the next day he had numerous convulsions, and on the day following it was noticed that his breathing was "funny," and that he was unable to cough properly.

On admission he presented the following symptoms. He was well-nourished, preferred the dorsal decubitus, was unable to hold up his head, could not cry, and had a weak, ineffectual cough. His color was good, the alae nasi dilated, the movements of the thorax very slight, and the lower ribs were drawn in on inspiration, expanded on expiration. Respirations 40-50 per minute. Much general bronchitis. Heart natural. Legs not apparently paralyzed, but knee-jerks absent. No nasal regurgitation. Apparently paralysis of accommodation.

Thus, at this period there were definite and severe paralysis of the intercostal muscles, loss of knee-jerks, and general muscular weakness, but no complete paralysis of any one limb. On account of the difficulty in coughing and the accumulation of secretion in the lungs the child was dangerously ill. The lower end of the bed was kept raised and no pillow allowed. The benefit of the action of gravity was by this means obtained. Liquor atropinae and, later on, tincture of belladonna were given to lessen the secretion.

On November the 7th it was necessary to commence nasal feeding, as the child was incapable of swallowing. This had to be kept up for a few days. On the 8th he had an attack of tachycardia during the morning. Cultivations from the throat yielded a growth of Klebs-Loeffler bacillus. Three days later it was noted that the right arm was distinctly weaker than the left, and that the legs were moved very little. On November the 22nd there was cervical adenitis on the left side. Three days later there were nasal discharge, fever, and malaise.

On November the 30th a small patch of consolidation was found in the right supra-scapular fossa, which cleared up two weeks later. The left ventricle was considerably dilated, the dilatation subsiding in a week. The glands in the left side of the neck remained enlarged for some weeks. On January the 4th, 1905, left otorrhea developed. There was no evidence of intercostal paralysis after December the 30th.

On February 17th it was noted that the boy was quite well, except for the paralysis. The knee-jerks were absent. He sat up with difficulty. The electrical reactions in the muscles supporting the spine were normal in character but weak. There was no response to either strong faradic or galvanic currents in the muscles of the buttocks or lower limbs, except in the plantar muscles. The amount of voluntary muscular power in the legs was slight and in the arms was deficient, being weaker in the right than the left.

In June he was re-admitted for bronchitis. He still had paralysis of the lower limbs, absence of electrical reactions in the muscles of the buttocks and legs, except the plantar muscles; weakness of the muscles of the spine and of the left abdominal muscles, allowing "ballooning" of the abdomen on that side when he cried.

The points in favor of diphtheria were the attack of laryngitis, the recovery of the diphtheria bacillus from the throat, the difficulty in swallowing, the evidence of paralysis of accommodation, the subsequent adenitis, nasal discharge, and otorrhea, the temperary attack of tachycardia and the dilatation of the heart.

That there has been an anterior poliomyelitis is, I think, quite certain. The extent of the paralysis, the absence of electrical excitability, and the slight improvement are opposed to a diagnosis of extensive diphtheritic palsy. Further there was no evidence of nasal regurgitation or of paralysis of the soft palate, but the latter is hard to recognize in a mild form in an infant. The marked intercostal paralysis coming on before that of the limbs is very unusual. Convulsions and vomiting at the onset are also in favor of the diagnosis. I regard this case as one of acute poliomyelitis occurring during convalescence from a mild attack of diphtheria and associated with a certain degree of diphtheritic paralysis.

SOCIETY PROCEEDINGS

CHICAGO PEDIATRIC SOCIETY.

A regular meeting was held October 17, 1904, with the President, Dr. Samuel J. Walker, in the chair.

MANAGEMENT OF MATERNAL FEEDING. Dr. Effa V. Davies read this paper. See PEDIATRICS, Dec. 1905. Dr. Wm. J. Butler, in discussion said that Dr. Davies had covered the subject so well it seemed as though there was little more to add. One thing would be of great value, if we could find a solution to the problem, and that would be to enable all mothers to nurse their infants. While the causes mentioned were probably the ones which were responsible, a knowledge of them was of very little assistance in correcting the difficulty, namely, to make the breast of the mother secrete milk. However, much could be accomplished along this line if each individual physician delivering a mother would encourage, and as far as possible, promote by attention to hygiene, the flow of breast milk. But too frequently in the first days of life, when the physician and all concerned seem to encounter more difficulties than usual, errors of judgment were made as to whether the child should be continued on the breast or be weaned at once. Occasionally there was a gastro-intestinal disturbance, and frequently this, or almost any acute symptom, that did not represent a gross pathological lesion, was referred to the breast milk, which was often erroneous, because gastro-intestinal disturbances in the first few days or weeks of life were not uncommon. They might exist as an associate condition of some infection, or occasionally might be primary, the result of infection introduced at the time of birth, or subsequently to birth by the introduction of an unclean finger into the mouth of the child, or by giving it unsterilized water, etc. Furthermore, infection from the respiratory tract, from the cord, and from ophthalmia might have these associated gastro-intestinal disturbances, which fact might be lost sight of and the trouble regarded as primary. Occasionally, under such circumstances the child was taken from the breast and put on artificial feeding, and unfortunately so, when there was no tenable reason for it. Not infrequently, breast feeding was discontinued because the mother apparently had insufficient nursing, which seemed to be unwarranted because supplementary feeding would fulfill the requirements of the infant and continued nursing would help to increase the secretion of milk.

Dr. J. W. Chapin added one suggestion to the valuable ones Dr. Davies had given in her paper. This was in regard to what we could do when the mother's milk began to fail or was lacking. He had found, in his experience, an advantage in feeding the mother regularly twice or more a day on cornmeal gruel. It was a very simple thing and should be given to her as a liquid so that she could drink it. A bowl full of this gruel twice a day would do wonders with the mother's milk. No less an authority than Dr. Southworth, New York, spoke glowingly of this method, and the speaker's own experience had been that it would increase the milk.

Dr. J. W. Van Derslice said there were one or two points he would like to dispute with Dr. Davies, which were given in her admirable paper. He believed, first, last and all the time that pregnancy was an excuse for weaning the child. The next point was wet nursing. He believed that wet nursing was not the next step after the mother's milk failed. He thought artificial feeding to-day was a superior method of feeding a child than the hit or miss wet nurse. The liability of securing for a wet nurse a person tainted with syphillis or tuberculosis, was too great. This was especially so in the cities where medical acquaintance with patients was of a more or less transient charcter. The rather common practice of having the mothers of healthy thriving children with a superfluity of milk nurse the babies of less fortunate mothers was most pernicious, as we could not preclude the possibility of thus exposing an innocent mother and her babe to infection. This might not hold true in families where both parties had been under supervision for a continued period, and we were capable of judging the moral and physical hazard of such an experiment, but only in such cases should we be willing to recommend wet nursing.

Dr. Frank S. Churchill said that this was a very important subject, and he thought it was wise to discuss it from time to time. He did not know that anybody was more enthusiastic about substitute feeding, when they had to do it, than he. At the same time, he was very much in favor of maternal feeding, if he could get the mother in a proper condition to nurse the baby. He thought often with a little care and attention to the details of the mother's life we might get this, and that all of us should use every effort to put the mother in such a state that she could nurse during the first few months, especially if the baby was born in the late months of spring, because babies did so much better on the breast than on modified cow's milk. He could not agree with Dr. Van Derslice. He thought that next to own mother's milk a good wet nurse was best, but a "good" wet nurse was very difficult to get. Furthermore, few families liked to have a wet nurse, especially nowadays when such progress had been made in feeding with modified cow's milk.

In a certain case the baby during the second month failed to gain weight and for two weeks stood still. The breast milk was examined and normal percentages of fat and proteids found, but low sugar, about 5%. He made a solution of milk sugar, fed this to the baby in small amounts for five or six weeks, when the breast milk was again examined and found to contain 7 per cent. of sugar. That particular baby was apparently perfectly well; the only thing wrong was that she did not gain weight; and this was obviously from lack of sugar, for she began to gain at once when the sugar solution was added to her diet.

Two other cases had recently given considerable trouble. In both there was a very high percentage of sugar in the breast milk; in one mother 9%, and in the other 8%, and in both a low percentage of fat and proteïds. The first patient he saw in consultation, and, after talking with the attending physician, they concluded that the only thing to do was to struggle along with the baby in the hope that it would learn to adapt itself to the large amount of sugar. This happened about 6 weeks ago, and to-day the baby was in better shape than before. Both babies had colic and frequent stools, some of them decidedly green. In the other case he had the breast milk examined and found proteids normal, fat low, and sugar in excess. The mother was a very neurotic woman; this was the third baby, and she insisted that as soon as the baby was born it should be put upon the bottle. He staved it off a month, but the mother was nervous and hysterical, and he had given the baby a modified milk which was rich in fat and proteids, but having little sugar. The baby was much more comfortable; the total amount of sugar it was getting in 24 hours had been cut down by reducing the number of breast-feedings, substituting diet poor in sugar.

Dr. Effa V. Davies, in closing the discussion, said, in regard to the suggestion of gruel feeding, she had tried that and found it useful. She did not go into the question of diet as it would have made her paper too long to take up the subject in detail. In regard to hit or miss wet nursing, she did not want to be quoted as advising a hit or miss wet nurse, but she thought that was usually the situation, and it was generally hit or miss because the subject of breast feeding was not studied carefully enough. It was not to be taken for granted, that if a woman was nursing a baby she was a good wet nurse. A nurse that did not have sufficient milk for her own baby at five or six months, might successfully nurse a baby of five or six weeks. That was an arrangement which gave us quantity, and she believed there was very little change in the quality of the milk. She did not know that it had been demonstrated, but it had been her experience that no matter how old the breast milk was, if there was enough in quantity a young baby might thrive on it. If the milk contained colestrum it was likely to prove laxative because it contained an excess of sugar. There were a great many things to be considered in regard to wet nursing, but if we were very particular about the growth and development of the child, mother's milk was the thing, and not artificial feeding. Once in awhile a child would seem to develop properly on artificial feeding, but if we wanted a really well-developed baby mother's milk was superior. She was in the business of the artificial feeding of babies, so she was not predjudiced.

In regard to the questions of Dr. Cook—when to wean a baby? that depended upon the baby, she believed he said. Her experience was if after nine months a child did not develop properly on only the mother's milk, though the milk be perfect, that there was need of other food after nine months. With bottle feeding she began to give the child some semi-solid food at eight or nine months, and the same with the breast-fed baby. As a matter of fact, mothers were very likely to give children a taste of this or that at home without the doctor's permission, much earlier than eight or nine months, and she had been called to attend convulsions simply because they did this. While this was true, it ought not to prejudice us against the use of *proper food* at eight or nine months. She had seen babies rachitic and semi-rachitic on their mother's milk, not because possibly it was not all right for what it was intended to do for the child, but it was given too long. She had never been called to a case of convulsions in a baby where the mother was giving it solely her own milk. As to the rise in temperature in the newly-born child during the first two or three weeks of life, where no infection or other reason could be given, she thought the theory spoken of by Holt, of starvation, was a good one. She had seen rise of temperature in otherwise healthy babies disappear promptly on the arrival of larger quantities of mother's milk. In regard to mixed feeding and the conserving of mother's milk, even though she had not enough for her baby, she thought it was of great importance to save what she had. What little milk she had should be given religiously to the child and the feeding supplemented. One or two nursings in 24 hours would start proper digestion in the child, and in addition, it could be artificially fed.

In regard to milk analyses, she was sorry to say that it was so expensive and such a long, difficult process that she did not do it as much as she would like to. Much could be learned by studying this closely. We should not draw conclusions too quickly from one analysis. There were a good many clinical signs that would pretty closely tell what was wrong without analysis. The presence of too much sugar in the mother's milk she had learned to recognize without analysis. Just how high the percentage went she could not tell, but she could tell when a child got milk which was too sweet by its behavior. To draw the conclusion that the milk contained too much sugar or too much proteid, from one analysis was wrong. Several analyses should be made, because we found in studying the milk the child got from its mother that the amount varied greatly. She thought it possible that when the breast was beginning to secrete, to take on its new function, it might vary more than later in the nursing period, and great care should be taken before it was decided that the milk was too rich or too poor in certain elements within the first few weeks of nursing.

FEEDING SICK BABIES.—Dr. I. A. Abt made some remarks on this subject (See page 152).

REPORT OF FEEDING WITH CITRATE OF SODA.—Dr. J. W. Van Derslice followed with this paper. (See PEDIATRICS, Dec.) These two papers were discussed together.

Dr. Frank S. Churchill said that he did not know where to begin because this was such a vast subject. He thought it was a very wise thing for the society to take it up once a year because it was evident from what had been said that the last word upon infant feeding had not yet been uttered. Much progress had been made, but we were far from preparing a substitute food that came anywhere near being as good as the average breast milk. We were all agreed up to the point that a substitute food for the baby should as closely resemble human breast milk as possible, but as to the method of preparing such food, we began to diverge and had different methods to advocate. It seemed to him one could see in the discussion going on, a tendency to crystalize the whole subject into three groups: That was, the study of what one might call fatty indigestion, proteid indigestion and sugar indigestion. In all cases of difficult feeding in infancy, probably more than one of these elements was concerned.

As to the symptoms of these various forms of indigestion, he did not think we were in a position to state definitely what symptoms were to be expected. We knew as suggestive of too much fat that the baby vomited, was very apt to be constipated and have hard, whitish stools. The symptoms of sugar indigestion were too much wind, an excessive amount of colic, and perhaps a good many stools which were green and very acid. Proteid indigestion was probably better understood than the other two forms. It was very well known that the child who was getting an excessive amount of proteid would have a great deal of proteid and large curds would be present in the stools. The problem was to determine what form of indigestion the child was suffering from and then correct it as far as we could.

In regard to artificial feeding, it seemed to him we wanted to do the thing accurately; we could of course, instruct the mother or nurse to give the baby milk and water in certain amounts and heat the milk. It was much more sensible, however, to prescribe for the baby definite amounts of the three elements which made up the bulk of its food. He thought we could get very much better results by attempting accuracy in the feeding of babies and by teaching mothers and nurses to give them definite percentages of these different elements, according to the needs of the child. We should study the infant; each baby was a law unto itself and must be fed accordingly.

He was sorry to hear Dr. Abt use the term "milk" indigestion. It was as rational to say that "food" did not agree with an adult as to say that "milk" did not agree with the baby. What did he mean when he said that food did not agree with adults? When they complained, the physician enquired what part of their food was at fault, whether they were getting too much meat, too much highly-spiced food, too much vegetable food, too much starchy food, or were drinking too much, smoking too much. It was the same way with the baby. The physician tried to find out whether he was getting too much fat or too little fat, too much or too little proteid, too much or too little sugar. When one considered the composition of milk it seemed very indefinite to say that "milk" did not agree with the baby.

Another very important subject that marked progress in infant feeding was a more definite knowledge of the proteids of cow's milk as compared with the proteids of breast milk. Proteid was a very complex material, the two most important elements in it being casein and lactalbumen. Those two existed in breast milk in different proportions from cow's milk, 2½ parts of lactalbumen to 1 of casein in breast milk, whereas in cow's milk it was 1 part lactalbumen to 5 parts caseinogen. Casein was very difficult of digestion, lactalbumen very easy to digest. So the aim should be to try to supply these proteids in such a way that the percentage shall most resemble the percentages found in breast milk. In many cases casein must be eliminated altogether. In order to do that we fed the baby whey. He would like to emphasize what Dr. Abt said about the importance of pasteurizing the whey. It was just as necessary as to pasteurize the milk, because the microorganisms were just as active as in the milk.

Dr. Van Derslice's paper was extremely interesting to him He had not tried this method, but would do so now in view of the results Dr. Van Derslice reported. He was somewhat surprised, however, that he expected to put a six months' baby on whole cow's milk. His own experience and observation of other men's practice had been that very few babies at six months were able to take whole milk. Theoretically, they had a digestion suited to breast milk, and that contained 1 to 2 per cent. of proteids, while cow's milk contained 4 per cent. of proteids. This seemed a task on the digestive organs. He believed it was the exceptional baby of six months who could take care of whole milk.

He emphasized the importance of studying cases and grouping them, inquiring as to the particular form of indigestion in the baby he was studying, then trying to correct that form of indigestion and prescribing definite amounts of the elements suited to the capacity of the baby.

Dr. William J. Butler said, concerning the feeding in gastroenteric cases, he was glad to hear Dr. Abt's experience with whey. Such cases were, of course, of various grades of severity, depending in one case on the degree of functional disturbance and in the other upon the intensity of the infection. The differentiation between gastro-intestinal indigestion and gastro-enteritis, sometimes was difficult to determine, and possibly it was a matter of indifference in the chronic forms as far as their management was concerned. In acute cases of gastro-intestinal infection the blandest food possible was desirable. As to the time when the child's food should be increased beyond cereal gruels in acute cases, it might be difficult to determine. He thought we must rely on absence of temperature and apparent improvement in the general condition of the child, and the stools. He had had similar experiences to the one mentioned by Dr. Abt about a patient progressing favorably and then receiving without his knowledge milk, either whole or diluted, when the child would quickly show evidences of severe infection and succumb either as a result of the intensity of the same or in convulsions. He thought, however, the question of temperature and generally improved condition of the child and his stools were valuable as indicating the time when we could enlarge upon the diet.

He had noticed that in some cases of enterocolitis of an infective type whey was not well tolerated in the acute stage. He did not believe, however, as stated by Dr. Abt, that it was always due to bacteria in the whey, because he had tried sterilized whey with similar results. He thought a parallel to this was found in typhoid; a typhoid case might be running along nicely upon whatever liquid diet might be given when the patient received some additional article, as egg, and presently an increase in temperature and abdominal symptoms were noted, suggesting an intensification of the existing infection. The same was true in some cases of enterocolitis, with regard to whey, because proteid was not tolerated by some cases, and whey contained some proteid. There was an increase in the temperature and symptoms of the child, and it would do badly for a day or two, but if the intestinal tract was cleared out and whey stopped, these children would go back to where they were, and if left alone until the evidence of acute infection disappeared and the enterocolitis had subsided, we could then give the whey, either whole or diluted, for a few days, then gradually increase the strength of the food.

As to marasmus cases, the various theories advanced as to the cause of the marasmus were interesting, but one after another was found to be insufficient, and in all probability the last one would be found the most wanting. He thought our clinical experience was that marasmus, when not following some acute infection, or accompanying some chronic one, invariably arose from improper feeding. Whatever might be the particular factor in the diet, they all dated back to a similar history and they all had a similar termination, especially in hospitals. He did not know of anything more fatal in hospitals than marasmus. Something like a year ago he looked over the history sheets of marasmus at the Cook County Hospital and found that about 99 per cent. of the patients died. Outside of the hospital the mortality was somewhat better, but still was exceedingly bad.

Dr. Effa V. Davies said she would like to say a word or two in regard to the child taking whole milk at six months. She thought as physicians we forget that many chidren would thrive on whole milk, even before six months. She was astonished to find that true by seeing two or three children whose mothers had fed them in that way. One came under her observation where all sorts of modifications of milk had been tried and the child refused to thrive. Finally the mother gave it whole milk, a baby only three months old, and it had grown fat and hearty, and continued to do so. All she did was to warm the milk a little. She saw another patient that had gone through the same experience, and she thought it occurred more frequently than we realized. This case was reported to her by the child's father; she was taking care of a child in the family and was carefully modifying the milk. The father rather scoffed at the idea of taking so much pains and putting so much water in the formula. She asked for his experience and he said his first child had been given laboratory milk and refused to thrive. Finally a friend came in and said, "I can tell you what is the matter with that child; I have raised two or three. Get a little dairy milk, warm it, and give it to the baby." When the doctor came he was told what they were doing, and said, "It is contrary to all rules and regulations, but if the baby is thriving, go ahead."

These cases caused Dr. Davies to think perhaps she was missing something, and an experiment was made with a marasmic case in the nursery. To a three months' old infant a teaspoonful of whole cow's milk was given every two hours, gradually increasing until the child was taking an ounce or two with good results. Later she began modifying the quantity as her courage failed in keeping up the high percentage of proteid. The child's growth was slow, however, and she was not sure that it would not have been better to have kept on with the whole milk. Marasmic children were not so discouraging. It was only the matter of getting the right combination for them, and we might often succeed by taking unusual methods.

Dr. Samuel J. Walker stated that in his opinion there was no question that a majority of the best authorities in this country thought that modified fresh cow's milk was the best substitute for mother's milk in spite of the fact that some children seemingly did well on vegetable soups or undiluted milk or milk diluted with some proprietary or patent infant food, etc. In his experience, and he thought it was the experience of a majority of those present, the most fruitful source of infatile gastro-intestinal disturbances was the use of some patent or proprietary infant food. Most every child he saw, that had been artificially fed for a number of weeks or months, had had from two to four patent foods tried on it, with consequently more or less subacute indigestion. In the majority of cases this indiscriminate use of proprietary and patent foods was the source of the trouble for which he was called. In his experience, practically all these babies did well on properly modified cow's milk.

He emphasized what had been said about excessive fat in infant feeding. Until about a year ago he was in the habit of giving 4 per cent. fat to every infant that seemed to stand it as a routine procedure. During the last year, however, he gave the four per cent. fat only in the first three or four months of life, and then decreased it to three per cent. fat in the latter months of the first year, and he is sure he had better results in consequence. On the other hand, he thought there had been a general tendency toward giving too low percentages of proteids. His present opinion was that an infant should take as much proteid in its food as it could digest. He liked to give as high as 2½ and even 3 per cent. proteid, if that amount seemed to be taken care of in the stools.

Dr. J. W. Van Derslice, in closing the discussion, said, with reference to six months' old babies taking whole milk, he believed that when the citrate was added the milk could be easily digested by these babies. Professor Wright, who had had more experience with the use of citrate, urged the giving of whole milk from the first in many infants. Of course, one would expect that the "percentage milk" men would immediately attack the position of physicians, yet they must see that they did not offer a food that was all satisfactory, or why had developed this cry of "it is not the proteids, but the sugar or fat," as the case might be. He asked, where was the milk laboratory to which they sent their prescriptions for modified cow's milk a few years ago? Why necessary to close this valuable adjunct to feeding. Our little scientists surely could not point to home modification as scientific as, at best, it must be but a guess. He had found in the use of citrate, where he desired a uniformity of curd from day to day, that it became necessary to test the milk each day and by experiment it was shown that each day's supply varied as to the amount of citrate necessary. Examining the milk and cream, as delivered at his door by one of the largest milk dealers, he found it varied from day to day. This was especially true of the cream. Modified milk by prescription was out of reach of the poor people, and because of the measuring out of the different ingredients the home modification soon fell into disuse.

Dr. Abt, in closing the discussion, said, in referring to the feeding of whole milk, he could only say that it showed great diversity of opinion as to the proper methods of feeding. Whole milk had been fed marantic babies. Schlesinger, of Strassburg, strongly advocated the use of whole milk. Perhaps some of these men obtained results in some cases; but he did not believe that exceptional cases should prove the rule or should be made a universal standard of feeding. It was the experience of the profession in this country that they had better results with a graduated scheme of feeding babies than with any other. He believed that pecentage feeding furnished a working hypothesis which was suitable for the largest number of cases, and until we had some method which was a great deal better, we should adhere as closely as possible to it. In regard to the question of Dr. Cook, whether the entire source of marasmus was in the intestinal canal, he could not answer it. As the etiology was in doubt, all the theories which had been proposed considered that the condition started in the intestinal canal, except those cases which depended on an acute or chronic infection; as a result of the grave disturbances of digestion, there was probably brought about some condition of toxemia, or some severe perversion of normal metabolism which resulted in a general tissue starvation. Somebody had suggested that the perversion of metabolism occurred in the liver. The proof for this latter statement was lacking.

THE SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN.

SPECIAL MEETING FOR THE DISCUSSION OF PLEURAL EFFUSIONS, SEROUS AND PURULENT, IN CHILDREN.

A meeting of this Society was held at No. 11, Chandos Street, W., on December the 15th, Dr. Leonard Guthrie in the chair.

The discussion on the bacteriology and pathology of pleural effusions was opened by Dr. J. G. Emanuel (Birmingham). He remarked that serous are four times as common as purulent effusions in adults, but in children they occur in practically equal numbers. In adults a purulent effusion is often secondary to a serous, but in children it is generally purulent from the first. Seventy-five per cent. of empyemata are pnuemococcal, and these may be either secondary to pneumonia or primary. The pneumonic cases may be peri-pneumonic or meta-pneumonic. Streptococcal empyema is rare in children but common in adults. Empyemata containing staphylococci often indicate tuberculosis. An empyema complicating a case of pulmonary tuberculosis is generally pneumococcal or streptococcal. Pneumococcal empymata may be (1) localised to the pleural cavity; (2) may infect via the lymphatics, giving rise to pericarditis, peritonitis, etc.; (3) may infect via the blood-stream, giving rise to meningitis, endocarditis, etc. Dr. Emanuel further discussed the subject under the following headings: Pseudo-empyema—a collection of pus behind the parietal pleura simulating an ordinary empyema. Phagocytosis as an indication of virulence of the micro-organism. There is no essential bacteriological difference between serous and purulent effusions. The difficulty of distinguishing pleural transudations and exudations. The bacteriology of idiopathic sero-fibrinous effusions. Cyto-diagnosis. Pleurisy due to the typhoid bacillus. Rheumatic pleurisy.

Mr. Lockhart Mummery said that cases of empyema in children could be conveniently divided into two classes—(1) those where the infection is purely pneumococcal and (2) those where a mixed septic or tubercular infection exists. The great majority of cases are pneumococcal, and in these a free exit for pus is all that is required; drainage for any length of time is unnecessary, and it is often unnecessary to use a drainage-tube at all. In the other class of cases, and in those where much thickening of the pleura exists, good drainage is always necessary. He drew special attention to the importance of careful aseptic technique in all cases of empyema, as the dangers of secondary infection are considerable. In discussing the question of the anesthetic he advised the C.E. mixture of light chloroform and oxygen. The importance of not allowing a large empyema to empty too quickly was also mentioned. He advised irrigation of the pleural cavity with water or salt solution in suitable cases, and pointed out that the fatal results which have sometimes followed this practice are to be attributed to the iodine or carbolic acid solution used. Mr. Mummery considered the after-treatment of cases of empyema in children of the utmost importance. He mentioned the importance of not restricting the thoracic movement by tight bandages or heavy bed-clothes. He advised respiratory exercises to re-expand the lungs in all cases, at first expiration against resistance to enable the sound lung to expand the affected one, and later regular respiratory and muscular exercises in a surgical gymnasium, which should by preference be carried out in classes of several children by a skilled instructor.

Dr. G. A. Sutherland referred to the frequent absence and slight character of the symptoms in many cases of moderate pleural effusions. Breathlessness, and tiredness on exertion were the commonest symptoms complained of. Coughing, pyrexia, wasting and anemia were often present, but were not diagnostic. A lemon-colored skin and clubbing of the fingers, which had devoloped rapidly and without cyanosis, were strongly suggestive of purulent effusions. A diagnosis could only be made by a careful examination of the chest, noting the position and condition of the lungs, the heart and the diaphragm as indicated by the stomach resonance and the hepatic dulness. The chief use of the exploring needle was, not to determine the presence of fluid, but to distinguish between serous and purulent effusions.

Dr. Hobhouse (Brighton) said there could be no doubt that it is possible to cut short the acute pleurisy and prevent effusion by active measures in the early stage, but when once effusion has fairly commenced it is very doubtful whether it can be cut short by any medical measures. Two or three different lines of treatment have been pursued by different authorities. In the first instance it was sought to reduce the quantity of fluid by increasing the fluid output and reducing the intake. With this object diuretics, diaphoretics, and purgatives were given freely and a thirst diet adopted; most authorities are agreed that the results attained are by no means proportionate to the discomfort entailed. If a reasonable trial of medical measures is insufficient to reduce the effusion, it will be necessary to remove the fluid by puncture.

Dr. W. J. S. Bythell (Manchester) said about three years ago he undertook the investigation of the bacteriology of empyema in children, and the objects at which he aimed were to determine (1) the source of infection of the pleura, (2) the species of micro-organism, and (3) the influence of the bacteriology upon the clinical features of the disease. In forty cases of empyema—children whose ages varied between ten months and eleven years (of these twenty-seven were males and thirteen females)—the source of infection in over 80 per cent. was undoubtedly an acute bronchopneumonia, 10 per cent. an acute pneumococcic infection of a pre-existing pulmonary tuberculosis; in one case it followed upon a sarcoma of the lung. In six cases the empyema appeared to be "primary." The influence of age upon the species of bacteria is well known, and his observations confirmed fully the great relative frequency of pneumococcic empyema; the actual percentage in his own cases was ninety alone or with streptococcus. Turning to the clinical aspect of the bacteriology, he remarked that most writers are of opinion that the pneumococcus produces a comparatively mild type of empyema, and that streptococcus is more apt to give rise to symptoms of much greater severity. His own observations tended only partially to confirm this view; in four streptococcic cases they were very mild, and though the pneumococcic cases were milder than those in which other micro-organisms were present, yet several were distinguished by severe and long-continued symptoms.

Dr. William Ewart read the notes of a case under his care at the Belgrave Hospital of a boy, aged 10½ years, treated by paracentesis by syphonage with admission of air into the pleural cavity. The effusion, having recurred, was treated by intrapleural injections of adrenalin solution without paracentesis, with rapid recovery.

Mr. L. S. Dudgeon said that during the last five years he had made many examinations of the fluid taken from the chest in cases of serous and purulent effusion, and he thought that since Widal originally suggested that method it was found to be one of the most valuable we have, because if one drew off clear effusion and found the cells, either in few or large numbers, consisting entirely of lymphocytes, he thought one could definitely say it was tuberculous. If, on the other hand, one found what was described as the polynuclear phagocyte, one could say it was due to one of the pathogenic organisms. After a large experience during the last four or five years, he had found it practically constantly. Another point to which reference had not been made was that in one case he found a very large number of cells which showed active myototic figures, and when the child died it was found to suffer from diffuse sarcoma of the chest cavity and pleura. With regard to the bacteriology of the affections under consideration, sufficient had already been said about the pneumococcus, and probably someone who knew more about it would speak on that presently. In those cases of empyema which went to the post-mortem room, he in several instances drew off blood in a sterile glass syringe post-mortem, and obtained an abundant growth of pneumococcus, which suggested the fact that the fatal cases of empyema might be examples of pnuemococcal septicemia. With regard to another micro-organism, *Staphylococcus pyogenes aureus*, in four cases of bone abscess which developed empyema he obtained a pure culture of *Staphylococcus pyogenes aureus.* With regard to streptococcic infections, he thought it was time observers were more careful in speaking of streptococcic infections. That was extremely important, quite apart from bacteriology, because at the present day antistreptococcic serum was given by some people very readily on the recognition of a few cocci forming a chain. It was well known that the antistreptococcic sera were made from virulent cultures of streptococci, and very often much serum was given in cases which were not *Streptococcus pyogenes* infections at all. One of the most difficult matters in bacteriology at the present day was the identification of those streptococci. He was at present investigating that subject from organisms obtained from scarlet fever, and on the *Streptococcus pyogenes aureus* obtained in a general hospital, and it took from three weeks to a month to identify those streptococci. And though that was not of any particular value clinically, because the patient would probably by that time either be dead or have recovered, yet in the future it would perhaps be very valuable. It was important that the profession should not label things as streptococcic too readily. With regard to the method which had been referred to of digesting the pleuritic effusions and staining for turbecle bacilli, that had been carried out, and it was found that what had originally been described as tubercle bacilli were nothing more than the exudate taking up the carbo-fuchsin stain—that they were not bacilli at all. With regard to multiple empyemata, no reference was made to that subject. He remembered six cases when he was pathologist to the East London Hospital for Children, four of which went to the post-mortem room. All those patients had been operated upon and the chest drained, and doubt was expressed as to the reason they had died. In one case the empyema had been perfectly drained—but high up in the chest there was quite a clear effusion which had not been diagnosed—but was of very great interest because it was an empyema filling up a large part of the chest; the rest of it was perfectly clear effusion cut off by an adhesion. Another example was a case where, between the concave surface of the base of the lung and the diaphragm, there was a small collection of pus, absolutely shut off, on the base of the lung, while in a third kind of case—of which he had seen three examples—there was a collection of pus forming a second empyema, pointing down between the posterior border and lying on the vertebral column. They were all of extreme interest, because various causes, such as broncho-pneumonia, were thought to be present in the collapsed lung. The condition was really a localized empyema. He drew attention to another case in which empyema followed appendicitis in a child, and it was the only example of it he had seen from post-mortem examination. From the pus which was drawn off during life he obtained a pure culture of virulent *Bacillus coli.*

Dr. George Carpenter said that of 190 cases of pleurisy with effusion under his care 114 were in males and 76 were in females. The fibrinous totalled 85—48 right-sided, 36 left-sided and one double. There were 105 empyemas—50 right, 53 left, and 2 double. Of these cases 114 were in patients 5 years old or under, 75 being empyemas. Of the fibrinous cases 7 patients died, and of the empyemas 31 died, one of them suffering from lardaceous disease. Two were cases of pyopnuemothorax. Two cases of fibrinous effusion were associated with cutaneous gummata, and one boy of five developed a "white leg." Many commenced with a sudden, sharp febrile attack, 10 in 101 gave a history of a preceding exposure to wet and cold, a few the history of a fall or other traumatism. Many were caused by pnuemonia, broncho-pneumonia, bronchitis, and pertussis followed by pneumonia; some were associated with scarlatina, measles, rheumatism, tuberculosis of the lungs and pleura, typhoid fever, diphtheria, mumps and varicella; many gave a rheumatic or tuberculous family history. Of the 31 deaths from empyema there were five cases of pneumonia on the same or opposite side, 2 had peritonitis in addition, 1 had tuberculous meningitis; 4 died of tuberculosis in one form or another; 1 of scarlatina nephritis and exhaustion; 1 of intestinal nephritis; 2 died from exhaustion; 1 with cheesy tracheal glands; 2 died suddenly; 2 died out of hospital; 1 was undiagnosed (coma and convulsions); 2 had lardaceous disease, 1 pus in the abdomen; 1 died from pyemia; in 4 cases post-mortem was declined; 1 died of ? peritonitis; 1 case with fetid pus; 1 died on the operating table; 1 while washing out the pleura (convulsions and high temperature); 1 from abscess and gangrene of the lung. Of the 7 deaths from simple effusion, 1 had a mediastinal new growth; 1 was pyemic (bone); 1 died from pneumonia; 3 from tuberculosis; and 1 died from exhaustion after several aspirations. The quantity of fluid was variable. In simple effusion 46 oz. in a child of six, was the most he had removed, but Heyfelder had aspirated six pints from a boy of the same age. Of pus, the average in his experience was from 8 to 10 oz., caught at the time of operation, but a good deal drained away subsequently. A common clinincal type is that with physical signs of consolidation of the upper lower and middle lobes, with deficient, very rarely absent, vesicular murmur over the lower lobe. In another type the chest may be dull from apex to base, with good but *distant vesicular* breath sounds, or *distant tubular* breathing, perhaps heard on a deep breath only, and then only expiratory; or distant vesicular breath sounds with moist râles. With this extreme effusion there may be apical resonance or hyper-resonance, the breathing clear and distant, expiration prolonged and unduly audible compared with inspiration. A sector-shaped area of resonance may be obtained over the root of the lung and its immediate neighborhood. In another type there is dulness over the lower lobe, and deficient entry of air. Sometimes the breath sounds are distantly tubular. In either case there may be loud tubular breathing at the upper limit of dulness with friction sounds or not, sometimes with friction sounds alone, sometimes with pneumonic crackles only. Skodiac resonance can not infrequently be obtained in front over the corresponding apex, above the clavicle, below it, in both situations and sometimes behind. Skodiac resonance is also observed in basic consolidation and sometimes in apical. On the healthy side the breath sounds are extra-puerile. Percussion gives fluid dulness and fluid resistance, but both may be encountered over a *solid* lung. Because the dulness is not of fluid character it does not follow that fluid is not present. The note may be that of deficient resonance, and occasionally *stomach resonance* is obtained as far as the angle of the left scapula. Percussion should be light. Broncophony contraindicates fluid. A thickened pleura may give the signs of fluid in the chest. Displacement of the cardiac impulse is a most important guide in forming a diagnosis. In regard to the position occupied by the heart in such cases, in one autopsy on a child of six the organ was found vertically in the middle line of the body and the pericardium partially adherent to it. In another, a child of four, the heart lay more to the left of the sternum, but chiefly behind it. In another, aged 3 years, the mediastinal contents were shifted to the right without cardiac rotation. In another, right-sided effusion, patient aged 10 months, the heart was a little displaced to the left. Obliteration or even bulging of the interspaces happens occasionally, and is best seen by viewing the chest from above. Rarely there is fluctuation, sometimes there is edema. Increase of cutaneous thickness may be determined by pinching the skin and comparing it with that of the opposite side. In a female of four with empyema the chest was uniformly bulged forward from the clavicle to just below the nipple, and the sterno-clavicular point was loosened and the overlying skin was edematous. In a male of three there was marked localized bulging of the lower ribs of the right side; in a boy of seven there was a fluctuating swelling over the front of the left fifth, sixth, and seventh ribs; in a girl of six it formed over the left fourth, fifth and sixth ribs; in a boy of three perforation occurred at the seventh left interspace in the nipple line, with commencing subcutaneous abscess; and a boy of nine had an elastic fluctuating prominence over the right hypochrondriac region. None of these pulsated. Puffiness of the face and eyelids was seen in some cases. Only one of the patients had clubbing of the fingers and toes, a child of six, who had been ill for two years, and from whose chest he evacuated five ounces of pus. Temperature as a diagnostic sign between pus and serum he regarded as worthless; it might be high with serum and normal with pus. The fact that the effusion follows an exanthem, that it is associated with diarrhea, sweating and a sallow complexion, marked wasting, and an obviously low state of health are in favor of pus. Exploration is alone reliable. No danger need be apprehended from passing an exploring needle into a pleura full of fluid to determine the character of that fluid, but it *is* dangerous to pass a needle into a cirrhotic lung, and it may be dangerous to wound a pneumonic lung. In a doubtful case—a case that is open to doubt after a thorough physical examination conducted by all the means at our disposal—it is well to let the parents know beforehand that this trifling operation, which is often so helpful and usually so innocuous, is not altogether free from risk, and that the child *may* lose his life. The empyema cases were treated by incision in the seventh or eighth interspace, just outside the angle of the scapula—the majority by simple incision, but some by excision of a couple of inches of rib. In two or three instances Estlander's operation was necessary. A large sized rubber drain about the diameter of the little finger, to which a rubber shield was fixed, was passed into the wound just sufficient to keep it patent and allow free drainage. When the discharge became serous—but not until then—and a drachm or so of it visible on the dressing the tube was discarded. The time required was usually a few days—on an average a week or ten days. Although many cases were treated by simple incision, he was in favor of removing a small portion of rib, because it enables digital examination and facilitates drainage, unless the case be putrid, when the exposure of cancellous bone is not advisable. When the tube has been removed a rise of temperature does not necessarily mean imperfect drainage or re-accumulation. In several cases it was due to scarlet fever or measles, in others to pneumonia, tonsillitis, general tuberculosis, or peritonitis, sometimes to no apparent cause, and in others it appeared to be owing to a small superficial collection of pus about the wound. Even if there is *apparently* a cavity of some extent, the discharge being trifling and serous, an attempt should be made to banish the tube. After the operation there is usually a fair entry of air, with vesicular breath sounds, but these may be conducted sounds; he had heard such in a child with a completely collapsed lung. When the upper lobe is consolidated the physical signs persist for a variable period. Below the wound there may be distant tubular breathing, vesicular murmur, or râles, according to the state of the lung. When the cavity is completely sealed there may be deficient entry of air and impaired resonance. A permanent sinus may de-note necrosis of a rib; in one child many inches of rib were exfoliated. He attached great importance to getting the patient up and about as soon after operation as possible—a child should not stay in bed a day longer than necessary. While admitting that small empyemata may recover by aspiration only repeated once or more, he did not think that there are any advantages attached to this method, and there are many disadvantages. With simple effusions, if the pleural cavity be full, aspiration should be performed at once for fear of sudden death. Simple fluid should not be left in the chest *in statu quo* longer than three weeks lest the lung contract adhesions. If there be fever, the fluid should not be aspirated lest there be a re-accúmulation. Aspiration should cease as soon as the child commences to cough. A sharp, hollow needle must never be used. Many of the cases were successfully treated by limiting the fluid intake to half a pint daily and giving the food as dry as possible. Scott's ointment applied to the chest and iodide of potassium given internally appeared to him to be of some therapeutic value.

Mr. Arthur Edmunds said he desired to exhibit an apparatus to demonstate the importance, in relieving empyema, of making the opening into the chest sufficiently free, not only to allow of the pus being forced out voluntarily, but for other reasons. Although everyone had realized that the chest did fill in coughing and in violent expiration, he did not think it had been sufficiently realized that that method of expiratory filling of the affected lung was one which was constantly taking place. When the lung on the other side was connected with the affected one by a bronchus, and when the passage outwards was free, as in paralysis of the larynx, the movements of the chest-wall would have no effect on the movements of the other side; alterations in the tracheal pressure were not able to affect that lung. But if there was an obstruction in the outflow from that tube, which took place by the movements of the vocal cords, then on expiration the unsupported lung where there was an opening into the chest-wall would move also. That, he believed, took place not only in violent coughing, because he had shown by experiments on animals that after opening the chest-wall and setting up an irritative reflex from the pleural cavity, the examination of the vocal cord was sufficient to cause blockage, so that while the lung on the sound side was collapsing, the lung on the other side was expanding. That was the process which he felt sure was going on during the whole course of healing of an empyema,

EDITORIAL

THE COST OF CHILD LABOR.

In spite of all the agitation and legislation the child labor problem still confronts the public, and is likely to until there are enlisted in its solution not only philanthropists and altruists but also the rank and file of the country's population. Perhaps no more effective way of securing this cooperation can be hit upon than by bringing to the front the economic aspects of the question, the tremendous loss in productive power entailed upon the community by the wasteful employment of children during the period when they should be developing the forces which would make them profitable members of the community in adult life. The absolute folly of this expenditure of energy is shown by the fact that even disregarding its ultimate loss it brings no present gain to the child's family. That is, in trades where it is possible to use women and children, the entire earning capacity of the family is no larger than is that of the man alone in those trades where only men can be employed—a fact fraught with far-reaching significance for the thoughtful.

And for this mere semblance of gain, empty of reality, is bartered the future of the community.

The laws, pitifully inadequate as most of them are, are uninforced on one hand and evaded on the other, and children far below the legal age of 14 years toil day after day, not only for the "12 hours a day or 60 hours a week," which the Pennsylvania law, for instance, permits, but anywhere up to 68 hours in one week, and sixteen consecutive hours in one day. Night work, and night work alternating with day work, so that even if strength permitted the child can attend neither day nor night school, add their quota to the list of disastrous influences.

In the northern states much horror has frequently been expressed at the conditions in southern mill towns, but there is no need to cross Mason and Dixon's line to find painful realities. A recent number of *Charities* contains an article fairly but graphically depicting the state of more than 20,000 of the children of Pennsylvania, and that other northern states can furnish similar examples there is little doubt. The writer recently attended a New Year "party" at a settlement in a town in New York state, where the hostesses were girls employed in the local factories. "Over fourteen" of course they were supposed to be, but half of them would have failed to measure up to the ten year old girl in our own home, and hollow chests and bent shoulders augured ill for the future.

Aside from the physical disaster resulting from the hard work and long hours, a further evil is wrought by depriving these girls of all opportunity to learn how to keep a home. A girl whose life has been spent in the factory knows neither how to cook nor clean nor sew effectively, and married life for her spells disaster. She brings into the world children stunted physically, mentally and morally and does not know how to care for them after they are born.

A century ago the children of the working population of England were swept into the cotton mills, and to-day England is in a panic over the degenration of her national physique. That is the cost of child labor. Can we afford to pay it?

BRONCHITIS IN CHILDREN

Bronchitis, as Dr. Winter has noted in a recently published paper,[1] is a disease especially fatal to young children, nearly 50 per cent. of the deaths from this cause occurring in patients less than five years old, and, according to Samuel West, half the cases in children of that age proving fatal.

These figures are doubtless swelled considerably by the newborn infants who succumb to this disorder induced by exposure of some sort, whether in unwise bathing, in rooms of low temperature or in the open air. But during those first four or five years of life there has been noted a tendency in children for any bronchial catarrh to extend with dangerous rapidity to the smaller bronchi, and such a condition demands the most expert physiological management. After this period, when the longitudinal elastic tissue of the fibro-vascular coat has acquired adult characteristics, and can offer more resistance to pressure in the longitudinal vessels from inflammation, bronchitis is not so much to be feared.

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[1] Medical News, 7.8.

But in young children bronchitis is never other than alarming and fraught with danger. Either one of two types may be encountered. One involving the inner plexus, is sudden in attack and if not checked promptly and efficaciously proves fatal in a few days. When the outer plexus is the seat of involvement, however, the disease begins insidiously with indistinct symptoms and continues an obstinate course sometimes for several weeks. In bronchitis of the small tubes which is always secondary and due to extension from the larger tubes the sudden accession and marked collapse give the appearance of a primary affection.

In diagnosis, temperature has no value, but ausculation may reveal fine crepitations at both bases posteriorly, or the tubes may be so choked by mucus or by swelling of the membrane that the breath sound may fail entirely over both bases posteriorly.

Dr. Winter regards the respiratory act as characteristic, and describes it as follows: "A short, labored inspiration in which all the accessory inspiratory muscles participate, marked recession of the lower part of the thorax, and retraction of all the inferior intercostal spaces, followed by prolonged difficult expiration, in which the abdominal muscles participate. Whenever the expiration becomes prolonged in bronchitis, extension into the fine tubes is to be apprehended."

Treatment should include mild diaphoresis, gentle catharsis, cardiac sedatives, and warm, soothing air to come in contact with the respiratory tract. The temperature of the air breathed should be kept evenly at 72° F., and ventilation made as perfect as possible, at the same time rigorously excluding all draughts. The little patient should wear light flannel over the entire body, and a change of suits be always on hand.

In case drugs become necessary, aconite is the chief reliance to limit arterial pressure. Diaphoresis, best secured by the use of sweet spirits of niter, also lessens arterial pressure. Baths, sponging, and the coal tar antipyretics are distinctly contraindicated. For diminishing the excessive secretion which may inundate the bronchi, camphor is useful, also carbonate of ammonia, nux vomica, oxygen inhalations, and counter-irritation. For the last named, mustard, one part to six of flour, mixed to a paste with white of egg and cold water and applied between linen cloths is invaluable. When a more serious condition of deluged tubes has been reached recourse should be had to emesis, and the patient kept in a prone position, in order that the excessive secretions shall be ejected by coughing rather than swallowed.

In this disorder, as in others to which infancy is subject, much depends on the previous feeding of the child, and those which have had the advantage of mother's milk from birth will successfully combat an attack of bronchitis which would prove fatal to those fed on proprietary foods or pasteurized or sterilized milk.

ABSTRACTS

Acute Leukemia in Early Life.—Churchill (Trans. Am. Pediat. Soc., Phila., vol. xvi. p. 193).

All cases of leukemia are myelogenous in origin. As in adults, the acute variety is more apt to be of the lymphatic type. The disease is rare in early as in later life. It is, however, more common than has been supposed, twenty-two cases of the acute or sub-acute variety having been reported since 1898, while previous to that date only seven cases are on record. The organs and tissues generally are infiltrated with lymphadenoid cells, closely resembling the small mononuclear lymphocytes to be seen in the blood during life, showing the widespread distribution of these elements. The involvement of the bone-marrow is confirmatory of the views of Neumann and others, that no case of leukemia, thoroughly studied, has failed to show an abnormal condition of the structure. The change is undoubtedly the result of a chemiotactic agent acting upon the bone-marrow, the clinical manifestations and type of the disease depending on the nature of the chemiotactic agent, but of the real nature of its action we know nothing. There seems to be nothing in the family or previous history which can be regarded as predisposing to the disease. As to direct heredity, there have been recorded only two cases of the condition occurring in both parent and child, too few from which to draw any conclusions. As with heredity, so with the previous history of the cases, nothing appears to act as a predisposing cause, except, possibly, chronic tonsilitis. It is not probable from the data available that tubercle plays a part, either direct or indirect, in the causation of the condition. Susmann, studying the relation of leukemia and tubercle, even concludes that a certain antagonism exists between the two conditions. No age is exempt, leukemia having been observed in the new-born babe and as late in life as seventy-one years. The onset may be sudden, but more often is insidious, with vague, indefinite symptoms, which gradually develop into the typical leukemia picture. The general course of the disease in children, on the whole, is the same as in adults, and is always fatal. It occurs more freqeuntly in males. The spleen is enlarged in all cases, and the liver generally, though the enlargement is, as a rule, not very great. General glandular enlargement is not constant, the cervical glands being those most frequently affected. The duration of the condition varies from a few days to five months. As in the adult the chief interest in leukemia centers in the blood. There is a diminution in the hemoglobin and in erythrocytes. The lowest red count recorded after several hemorrhages is 750,000. The leucocyte counts range from 6,000 to 810,000. The differential count shows that out of twenty-nine cases twenty-five were of the lymphocytic type, one myelocytic, two of the mixed cell variety, and one case undetermined. The lymphocytosis, furthermore, is more apt to be of the small-celled variety. The polymorphonuclears are always reduced, often to an extreme degree. Except in the myelocytic and mixed cases, myelocytes are rarely present, and then only in small numbers. Nucleated reds are also rare, though found occasionally. The course in children differs from the adult type only in minor details; hemorrhages are fewer and less severe, and the lymphocytosis more apt to be of the small variety. Abnormal appearances are found postmortem in practically all the tissues and organs of the body, consisting of excessive infiltration of the tissues with small mononuclear lymphoid cells, identical in appearnce with the small lymphocyte with which during life the blood is flooded. Treatment is of no avail. Arsenic is generally given, but is useless. Treatment by means of X-rays gives no promise of permanent help. Injections of antistreptococcic and antipneumococcic sera have been suggested.

Brachial Birth Palsy.—DRS. CLARK, TAYLOR AND PROUT (Am. Journ. Med. Sc., Phila., 1905, October, p. 670).

Many new facts are embodied in this research, concerning the causation and pathology of the laceration type of birth palsy, of which the following is a brief summary:—

1. The cause of the laceration type is tension on the nerve trunks, which first ruptures the nerve sheaths and then the nerve fibres. The prevention of this serious lesion of the cervical nerve trunks rests with the obstetrician, who should not over stretch the child's neck in the process of delivery.

2. The persistence of the palsy is clearly explained by the pathological findings, namely—(a) Rupture of the perineural sheath with hemorrhage into its substance, resulting in the formation of hematoma or hematomatous infiltration of the neighboring tissues; (b) the cicatricial contractions following organization of the blood clot and repair of the rent in the perineural sheath. The connective tissue formed indents and presses on the nerve bundles, strangulating them, and preventing regeneration of the nerve fibres. In some instances the same result is accomplished by the turning inwards of the perineural sheath on the nerve bundles.

3. The nature of the lesions in all cases demands excision of the damaged areas, and suture of the divided ends as soon

as it is proven that spontaneous repair will not take place. The plan of treatment is then the same as that for peripheral nerve injuries elsewhere.

4. In all cases such treatment as will prevent contractions or deformities and maintain muscle tone in the paralyzed limb, should be systematically used, until either spontaneous recovery occur, or operation is done (traumatic neuritis is a contra-indication to active treatment). It is obvious that the above measures should be continued after operation.

5. The proper time for surgical interference is not yet definitely fixed. It appears, however, to be much later than two or three months after birth, as advised in Kennedy's report. At the present time, one year would seem to be a reasonable delay before operation.

6. Sufficient time has not elapsed in the majority of the seven cases quoted in detail for final results to have appeared. At the age of eighteen months, in two cases the improvement in nutrition, range of motion, and muscle power, in the paralyzed limb, were sufficient to demonstrate the value of the operative procedure.

Infantile and Juvenile Tabes.—HIRTZ AND LEMAIRE (Presse Méd., Paris, 1905, No. 40.).

The existence of true tabes dorsalis in children has been doubted by many authorities, and nearly all have agreed as to its extreme rarity. The authors of the paper under review record forty-seven cases in which they consider the diagnosis of infantile tabes to be beyond question, thus differing from Ormerod, who says that if we exclude cases of Friedreich's hereditary ataxia, the disease is practically unknown. Hirtz and Lemaire maintain, on the other hand, that it is almost impossible to avoid the diagnosis of tabes when we have a symptom complex of urinary incontinence, loss of knee-jerks, visceral crises, lightning pains, and disturbances of sensation. They, however, admit that pupillary troubles, loss of tendon reflex, and lymphocytosis of the cerebro-spinal fluid are equally characteristic of nervous syphilis as of tabes.

The most constant functional disturbance of the pre-ataxic period of juvenile tabes is incontinence of urine. It occurs in about half the cases, and is very much more frequent than in the adult. Lightning pains, on the other hand, are a frequent mode of incidence in the adult, whereas they are relatively rare in the child. In 14 per cent. of the cases, amblyopia was the symptom for which the child was first brought under observation.

Inco-ordination is always slight, and has generally to be sought for, whilst, on the other hand, the loss of the patellar and Achilles tendon reflexes is so well marked that the authors refuse to recognize a case as tabes in which these reflexes are present. Derangement of the objective sensations, such as anesthesia and paresthesia, are the most important functional symptoms of juvenile tabes. The syphilitic origin of the disease is insisted upon, with the obvious qualification that the syphilis is inherited in such cases. One of the cases quoted bears this out in a remarkable degree. The subject of undoubted congenital syphilis, he was attacked with gastric crises at the age of six years. He was still under observation when twenty-three years old, when he exhibited, in addition to the gastric crises, the Argyll-Robertson pupil, loss of knee-jerks, and a spontaneous fracture of the os calcis. The disease progresses exceedingly slowly in young subjects.

The authors conclude by pointing out that tabes is an uncommon manifestation of hereditary syphilis, the usual one being a diffuse inflammation of the cord and membranes, and that the spinal cord of the child seems to offer a special resistance to degeneration of the posterior columns.

Notes on Three Cases of Congenital Dislocation of the Hip.—Andrew Fullerton, M. D., F. R. C. S. (Med. Press, Jan. 3, 1906).

Case 1.—S. T., female, æt. 2 years and 1 month, was admitted to the Royal Victoria Hospital on account of a "lurching" in her gait. There was no history of injury to mother or child, either before or after birth. No deformity of any kind was known to have been present in any member of patient's family. The mother noticed that when the child began to walk its gait was peculiar, and she brought it to hospital to ascertain the cause. On examination the patient was found to be a healthy female child. On walking, she rolled over to the right side and had a very distinct limp. The trochanter on the affected side stood out prominently, and rode on the ilium with each step. The right leg was an inch and a half shorter than the left, but was not wasted. The trochanter on the affected side could not be felt below and behind the anterior superior iliac spine, and was about 1½ inches above Nelaton's line. It could, however, by traction be brought down to the extent of ¾ inch. The head of the femur was freely movable on the ilium. The displacement was upwards and backwards.

Operation.—On May 13th, 1904, the following procedure was carried out under chloroform: (1) Forcible abduction with kneading and percussion to stretch or lacerate the tense adductors. (2) Maximal flexion, with pushing of the head of bone downwards towards perineum to stretch glutei and other muscles tending to draw femur up. (3) Extension and counter-extension to stretch the above muscles with the iliopsoas and hamstrings; also to bring the head of the bone towards the acetabular cavity. (4) Abduction and external rotation assisted by the hand of the operator guiding head towards articular cavity. A sudden snap, audible and easily felt, indicated reduction. At this moment the leg became somewhat flexed on the thigh owing to the shortness of the hamstrings. The head was bored into the acetabular cavity by firm pressure so as to fix it more securely by making a deeper bed for its reception. The limb was put up in the fully abducted position with flexion at hip and knee joints and retained in that position by plaster of Paris bandages. The bandages were changed in a month owing to being soiled, and head of bone slipped out. It was, however, easily reduced. Fresh plaster was applied, and changed, first monthly and later at rarer intervals for a period of nine months altogether. At each change the limb was brought more and more into the normal position, until finally it was quite straight. The child was after the first few weeks allowed to walk, so as to push the head of the femur against the shallow acetabulum and deepen it. The patient was examined on December 14th by the members of the Ulster Medical Society—that is one year and seven months after operation—and the limb was found to be anatomically and functionally perfect. The skiagraphs taken before and after reduction show the characteristic deformity and its complete reduction..

Case 2.—W. M., male, æt. 8. No history of injury; was noticed to limp when he began to walk, which he did not do until he was æt. 3.

On Examination.—The boy walked lame and had a huge thick sole on his right boot to make up for a very obvious shortening of his right leg. The limb was not so well developed as the left, but there was no loss of power but rather considerable facility of movement. The affected leg was 2½ inches shorter than its fellow, and the trochanter raised above Nelaton's line. The limb could be lengthened to the extent of ¼ inch by traction. The movements of the head of the bone at the false joint were very free and painless. The head of femur could be felt almost on a level with the anterior superior spine, and was set further back than on the sound side. The trochanter was prominent. The skiagraph showed the femur to be considerably smaller in diameter than its fellow of the opposite side. The head and trochanter were also attenuated; the former looked like the truncated end of the neck. The acetabulum was shallow and ill-developed. From the skiagraph it would appear that the angle between the neck and shaft is increased on the affected side. No treatment has yet been adopted.

Case 3.—J. R., æt. 12, was seen on May 9th, 1904. She was a typical example of congenital dislocation at the hip joints. Walked with a marked waddling gait. Trochanters could be felt high up on ilium, 2½ inches above Nelaton's line, and posterior to acetabulum. On placing the hands on hips and asking the patient to walk, the up and down movement of the trochanters could be plainly felt. The hips were broad and the trochanters projected in a chracteristic manner. The thighs were separated by about an inch at the perineum There was marked lordosis. The femoral neck on both sides was short and thick as seen by skiagraph, the upper end of the bone resembling that of a humerus rather than that of a femur. There was no indication of an acetabulum on either side in the skiagraph. On traction, the heads of the femora could be drawn down to the extent of about an inch when the patient was lying down. As the girl can get about very comfortably her parents have decided not to submit her to operation.

The Subcutaneous Injection of Sea Water in the Treatment of Infantile Debility.—M. O. Mace and R. Quinton, (Medical Press, Jan. 3, 1906).

The success that has attended the subcutaneous injection of artificial serum in prematurely born and feeble infants is now generally known. For some time past attention has been directed to the results obtained by the use of salt (sea) water with the same object in view. In view of the manifest superiority of sea water over ordinary artificial serum it occurred to us to make use of it as a substitute for the serum in the same class of cases. We therefore undertook a series of observations in order to test this hypothesis, and although in the space at our disposal we cannot go into detail we can at any rate give the general results which may conceivably induce others to follow our example.

Our investigations were carried out in the wards allotted to feeble infants at the Paris Maternity Hospital. They bore on 40 infants, and we wish to lay special stress on the fact that they were 40 feeble infants, peculiarly weak or presenting some hereditary taint, brought to the hospital in an extremely precarious state of health, as evidenced by the very trifling gain in weight prior to the commencement of the treatment—viz., an average of 25 grains per day per infant.

The majority of these prematurely born and feeble infants were suffering from the usual infantile diseases—bronchitis, diarrhea, icterus, athrepsia, etc. We may lay it down, to begin with, that sea water, far from proving injurious in any possible way, appeared to us considerably to curtail the duration and diminish the gravity of the morbid phenomena. It caused the disappearance of jaundice usually in a comparatively short space of time. On no occasion did we see enteritis persist beyond five days under the sea water treatment even when originally severe. Respiratory affections were also favourably influenced thereby.

Lastly, in the subjects who were purely feeble without other morbid complication the subcutaneous injection of sea water yielded excellent results, rapidly causing the subsidence of all manifestations of debility, such as chilliness, cyanosis, digestive troubles and the like.

Even more convincing than these considerations was the prompt gain in body weight under the influence of the injections as compared with that following the employment of artificial serum, so largely used at the present time. We mentioned above that the average daily increase of weight in our little patients was 25 grains. With injections of artificial serum the gain per day per infant rose to 85 grains, whereas with sea water injections the daily gain amounted to 140 grains, the other circumstances and conditions being exactly the same.

It follows that the gain in weight, which affords us such a trustworthy indication of functional activity, is double under sea water injections of that which follows the injection of artificial serum and ten times greater than during the "expectant" period. These averages are based on 2,132 days' experience, a fact that will give a good idea of their relative value. No edema has ever been observed to follow the treatment.

Technical Details—Doses—Intervals. In conclusion we will describe the precise mode in which the treatment was carried out. With infants of an average weight of four pounds we injected every second day 10 c. c. (about 180 minims) of isotonic sea water, preferably just below the scapula. We attach great importance to the dose and the interval. Recent researches, indeed, seem to point to a certain timidity in the use of sea water on the part of some practitioners, timidity which there is nothing to justify; indeed on the contrary, when administered in homeopathic doses, sea water gives no results worth mentioning. Nothing less than the quantity specified can be trusted to bring about an improvement.

This dose of 10 c. c. every second day, though sufficient for prematurely born infants weighing four or five pounds, is inadequate when we have to deal with older children weighing from eight to twelve pounds. The injections should not be given oftener than every second day, but the dose may advantageously be increased to 30 c. c. and upwards.

It has been pointed out that sea water is the culture medium for organic cells. It is absolutely devoid of toxicity, and the white corpuscles thrive therein as if to the manner born. An animal may be injected with more than its body weight of sea water (Hallion) without causing the least sign of injury. Doses of 10 c. c. for infants represent a minimum below which it is undesirable to descend if we wish to obtain tangible results.

The Therapeutic Value of Lumbar Puncture in Children.—Tobler (Corres.-Blatt für Schweizer Aertze, April 1, 1905).

The author of this paper has had a wide experience of lumbar puncture, and it may be said at once that the results of that experience do not materially differ from those of other workers in the same field; that is, the results are disappointing, though in a few cases the procedure has appeared to benefit the patients. In estimating the value of therapeutic procedures in cases of meningitis, it is essential to remember the clinical course of the disease with which we have to deal, and its pathological histology. With these preliminary essentials kept in mind, it is obvious that the best that can be hoped for in tuberculous and suppurative meningitis is a temporary relief of some of the symptoms arising from excessive secretion and retention of the cerebro-spinal fluid. The author of this paper declares that in his experience even temporary amelioration is rare in these conditions, and his experience coincides with that of the majority. On the other hand, cerebro-spinal meningitis due to the diplococcus intra-cellularis is a disease which is by no means invariably fatal; indeed, it is possible to go further and assert that, at least in its sporadic form, its natural tendency is to recovery, and that a large number of the fatalities are due rather to the sequel of the inflammation than to the infectious agent directly. If, therefore, lumbar puncture is likely to be valuable as a therapeutic measure in any case, we should expect to find it so in these; but it is precisely here that we must remember the natural course of the disease, and be cautious when we are inclined to attribute recovery to our therapeutic procedures. Those who have previously written on the subject are not unanimous, probably from the varying weight they have given to the foregoing considerations. Dr. Tobler has practiced lumbar puncture fourteen times in seven cases of the disease, and believes that the procedure was beneficial in three of his cases. Of these three cases it must be observed that two were in patients aged respectively 6½ and 9½ years, and that diplococcus infection undoubtedly tends to be less fatal the older the patient is; the third patient was three years old. In our personal experience it has been a common event for a patient above two years to recover completely from the disease, but rare for any patient under two years of age. Hence we are inclined to discount Dr. Tobler's success. But we can at least admit that at present there is no other treatment which offers the least probability of shortening the disease, and agree that lumbar puncture should therefore be consistently practiced. Dr. Tobler mentions, further, a case which he believes was one of those described by Quincke as serous meningitis, which was distinctly benefited. Lastly, there are the large class of hydrocephalic effusions, both congenital and acquired. In these Tobler's experience coincides with that of all other physicians. Temporary amelioration follows in a few instances; permanent relief is all but unknown. The temporary relief has led to the adoption of various forms of permanent drainage, but the hopes raised have been disappointed to such an extent that the operation is now very rarely employed.

Stenosis of the Pylorus in Infants.—SCHMIDT (Münch. med. Wochnschr., February 14th, 1905). This paper contains a comprehensive review of the German literature on the title-subject. It goes almost without saying that there is no reference to English work on the subject, for it appears to be a settled conviction on the part of the German medical writer that England and America do not seriously contribute to medical literature. After reading this paper, most Englishmen with a knowledge of the subject will find that it has not added anything to their acquaintance with either clinical or pathological facts. The author views the historical side of the subject, sets forth the pathological theories of hypertrophy and spasm, recounts the opposing views of surgery and medicine in the question of treatment, and sums up the various operations which have been practiced for the relief of the condition, with the results. It is a pity that a paper which is so far complete and well-balanced, should ignore the work done in other countries.

Polyuria and the Urinary Excretion in Cerebro-spinal Meningitis.—LOEFER AND GOURAND (La Presse Méd., Feb. 1st, 1905). The practice of lumbar puncture has increased the certainty of diagnosis in cases of meningitis, and has enabled the clinical physician to recognise as phenomena of the disease certain symptoms before unregarded. Among these symptoms the authors regard as most important certain anomalies of urinary excretion, which they have found with such frequency as to lead them to attribute a high diagnostic value to their occurrence. The marked feature of the urinary excretion in cases of meningitis due to the meningo-coccus is the extraordinary quantity passed. One invalid, with a temperature ranging in the neighborhood of 104°F., passed a daily average of five pints of urine of a low specific gravity; and the amount of urea, of phosphates and of chlorides in this quantity of urine was in every case considerably above the normal, often twice as great. The authors have observed this phenomenon in seven successive cases, and very justly draw attention to its singularity: in all other infective fevers they point out that a deficiency of urinary excretion accompanies a rise of temperature; here alone we find an inverse condition. The explanation of the condition they find in the special liability of the medulla to the lesions, induced by the meningococcus, and quote in support of this view a case of tuberculous meningitis almost limited to the region of the medulla, which presented the same phenomenon of exaggerated urinary excretion. Attention to this point has enabled the authors to diagnose some cases of meningo-coccus meningitis which afterward were proven to be due to that organism by the results of lumbar puncture and autopsy.

The Infectivity and Management of Scarlet Fever.—PUGH (Lancet, 1905, Vol. i., p. 273). Though the throat has been considered to play an important part in the retention of infection, it is probably only rarely the source in the late stages; on the other hand, numerous observations have practically confirmed the frequency with which abnormal conditions of the nasal passages are associated with signs of retained infection. Otorrhea undoubtedly constitutes a danger of much less import than rhinorrhea, but the part played by this complication cannot be definitely gauged on account of its occurrence in association with this latter condition.

As regards desquamation, the opinion is growing that the infectious agent is not present in the shed cuticle. Apart from the foregoing, it must be recognized that return cases may arise from cases in which no morbid condition has been detected, and further, that a morbid condition may develop for the first time, or recur, after the patient has been sent home. Under these circumstances freedom from infection cannot be definitely ascertained, and it is evident that precautions should be continued after isolation is discontinued.

Turning to fomites, Dr. Chapin, of Providence, U. S. A., states that no one can doubt that such articles as cups, handkerchiefs, pillows, sheets, blankets, sofa cushions, towels, toys, and the like, liable to come in contact with the mouth or the nose of other persons may transmit the disease if smeared with infective secretions. On the other hand, secretion deposited elsewhere, generally speaking, cannot come into action until dry and pulverised, and when due allowance is made for the influence of light, dessication, and starvation upon the virulence and vitality of all pathogenic organisms it must certainly be seldom that germs in the form of dust are received in sufficiently potent dose to cause the disease.

Dr. Pugh quotes statistics showing that in cases treated at home subsequent cases occurred in 19.6 per cent. of the unprotected persons in those households, and in another instance in 26.1 per cent. Where the unprotected persons were sent away from home 5 per cent. contracted the disease and a further 1.8 per cent. on returning home. With hospital segregation the corresponding figures are 12.12 per cent. secondary cases, and 3.62 per cent. return cases.

To avoid the occurrence of return cases hospitals for true isolation have been recommended, each ward being a single-bedded cubicle. There are drawbacks in the management of such hospitals, but, as stated, these are not insurmountable.

Tuberculosis in Breast-fed Infants.—KLEPETAR (Prag. med. Wchnschft., 1905. Vol. xxx., p. 4). Dr. Klepetar reports the case of an infant 5½ months old, exclusively breast-fed, which suffered from acute pulmonary tuberculosis, the infection being evidently contracted from the mother, who also had pulmonary tuberculosis. He believes that such cases are not so rare as is stated, and draws attention to the necessity, from the infant's point of view, of separation from the mother, or the adoption of means sufficient to prevent the transfer of the disease.

The Digestion of Caseins, and its Relation to Certain Problems in Infant Feeding.—SOUTHWORTH (Medical Record, 1905, p. 321). Dr. Southworth's paper contains an instructive and interesting resumé on some recent work in connection with the chemistry of caseins. The amount of this constituent varies in different milks, and there is apparently great variety in physical characteristics.

Normally the casein in milk exists as calcium casein. The soft clot which is formed through the action of the rennet ferment consists of calcium paracasein, a necessary change preparatory to the occurrence of gastric digestion. The free hydrochloric acid in the stomach first dislodges the calcium, producing free paracasein, a more or less tough clot which is, however, readily dissolved in dilute salt solution.

When the amount of acid secreted by the stomach is sufficient, a combination takes place with the paracasein, producing hydrochloride of paracasein, a compound more difficult to digest in the absence of uncombined acid in the stomach than free paracasein, but with sufficient free acid more readily digested by pepsin.

Not only does hydrochloric acid form definite combination with paracasein, but the same is seen with other acids, notably lactic acid, and this lactate of paracasein, which may be formed under various conditions, is unfitted for intestinal digestion.

If the souring of milk has advanced outside the body to the point of complete curdling, clots of lactate of casein are formed, which exist in a very finely divided state, as in buttermilk, and these are more digestible than the corresponding compounds of paracasein with acid. It is now recognized that lactic acid-forming bacteria by the production of lactic acid prevent especially the development of the groups of putrefactive bacteria, and since lactic acid bacteria thrive and multiply in the presence of starch and sugar, it is possible that this offers a rational explanation of the beneficial results of restricting the diet to gruels in the cases of so-called summer diarrhea.

It does not seem too much to hope that the views brought forward by Dr. Southworth may be of assistance practically in dealing with the problem of infant feeding on the lines which he so aptly illustrates in the paper.

Raw or Boiled Milk?—BRUNING (Münch. med. Wochenschr., 1905, p. 349). As a supplementary test of the relative value of raw or boiled milk in infant feeding, Dr. Brüning decided to make observations of the results with animals. He details the results of an experiment with a litter of four puppies, two of which were fed by the mother, one by boiled cow's milk, and the remaining one on raw cow's milk. The two fed by the breast throve best in every way. The puppy on boiled milk gained distinctly less in weight, and had evidences of changes corresponding to rachitis. The puppy fed on raw milk was very backward, weak, ill-developed, and had signs of advanced "rachitic" changes.

Considerations Relating to Milk Supply.—ROBERTSON (Scottish Med. and Surg. Journal, 1905, p. 105). Dr. Robertson's paper is chiefly taken up with a review of the hygienic requirements in connection with the milk trade which are to be observed from the management of the farm till the milk reaches the consumer, and the list of regulations recommended is very similar to that advised by many previous writers. He is not altogether favorable to the giving of instruction in artificial feeding, though he admits that the practice tends in the right direction, and he is not at all sure that the practice of giving donations of money to mothers who have nursed their own children would prove of much avail in this country. He reserves his unqualified support for any method that would encourage breast feeding, and would only permit artificial feeding in the few necessitous cases where it is impossible. When artificial feeding is to be resorted to he recommends pasteurisation of cow's milk under present conditions. It is very doubtful whether he will obtain many to agree with his view that there is no "great objection to the employment of harmless antiseptics" so long as "they are used with caution."

Primary Heart Failure in Diphtheria.—Bolton (Lancet, 1905. Vol. i., p. 278). According to Dr. Bolton diphtheria, from both the pathological and clinical standpoints, may be provisionally divided into the following two stages:—(1) an acute toxic stage, the symptoms of which are referable to the action of toxin on the body; and (2) a convalescent stage during which paralytic phenomena are developed as a result of the action of toxone on the peripheral nerves. Vomiting, which occurs not infrequently in association with primary heart failure, may be secondary to such failure or to partial or complete suppression of the functions of the kidney. On the other hand, it may be a separate entity, since acute degenerative changes are met with in motor nucleus of the vagus during the toxemic stage.

The changes in the condition of the heart, pulse, and system generally in cases of cardiac failure are mentioned by the writer, and he states that from the pathological aspect ample evidence is forthcoming that death in acute diphtheria results from a direct action of the toxin on the neuro-muscular mechanism of the heart. He is of the opinion that degenerative changes occur in the central nervous system as a result of the action of the toxin, and not in a paralytic stage, the symptoms of which are referable to the action of toxone. If the patient has lived to become paralyzed his dose of toxin has been only moderate, or it has been neutralized by antitoxin, and, therefore, any changes in the central nervous system would be relatively slight or the cells would have recovered.

Abortive Diphtheria Paralysis.—Aubertin and Babonneix (La Presse Méd., 1905, p. 84). The authors refer to mild cases of post-diphtheritic paralysis in which there is a late affection of the palatal muscles and loss of the patellar tendon reflexes. They believe it to be probable that the underlying pathological lesion is a slight degree of poliomyelitis, and suggest that diphtheritic paralysis may show all varieties between a simple paralysis of the palate and a poliomyelitis giving clinical manifestations similar to Landry's paralysis.

Report of a Case of Post-Diphtheritic Paralysis.—BUTLER (Medical News, 1905, p. 117). Dr. Butler gives a short historical account of the pathological investigations and conclusions arrived at in fatal cases of post-diphtheritic paralysis, accompanied by the coincident increase in clinical knowledge. He then reports the case of a girl, 12 years old, showing evidence of a grave affection, including the heart as seen by attacks of syncope, cyanosis, galop rhythm, feeble pulse, etc., yet ending in recovery. He expresses the opinion that a small percentage of the fatal cases, where a marked bradycardia is observed, or excessive tachycardia following a bradycardia appears, die as a result of vagus paralysis. On the other hand, it is more than likely, he says, that the vast majority of these fatal cases result from an acute myocarditis. It may be that there are usually changes in both myocardium and vagus, the clinical picture varying according as one or the other predominates.

Treatment of Coryza in Infants.—BALLIN (Die Therapie der Gegenwart, 1905, p. 65). Coryza in infants is especially serious on account of the nasal obstruction produced and the consequent difficulty in feeding. In addition, bronchitis and broncho-pneumonia are more frequent complications than in adults. Dr. Ballin believes that these complications are due to the inhalation of infective secretion, and he gives figures from his experience showing that the use of adrenalin solution (1 in 1,000) 3 or 4 times a day causes a distinct improvement in both respects. The solution is applied to the nasal mucous membrane by means of cotton wool.

Duration of the Prodromal Period in Rötheln.—MILLER (Archiv. of Ped., 1905, p. 52). It is generally accepted that in most cases of rötheln prodromal symptoms are either entirely wanting or of short duration. Dr. Miller, however, reports three cases in which malaise, headache, joint pain, anorexia, conjunctival and pharyngeal hyperemia, and slight pyrexia existed from 4 to 6 days before the rash made its appearance.

The Feeding of Atrophic Infants.—VARIOT (Gaz. des Hôpitaux, 1905, p. 27). Dr. Variot proposes to retain the term infantile atrophy for those infants temporarily arrested in their growth, but exhibiting the possibility of being nourished on sterilized milk. For the marasmic infants, which are practically always incurable, he would reserve the name "athrepsiques." Where the retardation of development and emaciation are prolonged to a later date than usual, as, for instance, to the third year, he recommends the designation of "infantile bradytrophy." As regards the probability in any case of success attending the use of sterilized milk, he has found, he says, the limit of curability of atrophic infants is reached when they weigh less than the half of the normal weight between 3 and 8 months.

Atrophic infants are usually artificially fed. A small number receive an insufficient supply of nourishment. More often they are overfed with milk which is bad in quality and not suitable to their digestive powers. Some are rather over-filled than over-fed, i. e., they receive large quantities of too dilute milk. Vomiting and abdominal distension are often present in both the latter types. Dr. Variot strongly recommends the use of sterilized milk, and speaks highly of the "Gouttes de lait," the good results from which, he says, are largely dependent on the efficient administration and sufficient attendance through an ample staff.

He refers to some observations by M. Saint Albin showing the great variety of the relative degrees of heat radiation met with in different infants, but is unable to draw any useful conclusions. He has also endeavored to graduate the quantity of milk according to the weight rather than the age of the infant, but found the results unsatisfactory. He therefore recommends careful trials with each case, and even states that in occasional instances by this means with gradual additions he has found overfeeding give benefit where he had previously been unsuccessful.

The Bromides in Epilepsy.—PETERSON (American Medicine, June 24th, 1905, p. 1019). Dr. Peterson, who is the General Consultant to the Craig Colony for Epileptics, condemns the exhibition of large doses of the bromides. He believes that they are worse than the disease, and that the sum total of comfort, happiness and well-being of the epileptic would have been greater if the bromides had never been discovered. If the drug be used at all, it should be in small doses. He recommends that the patient should be sent to a colony for epileptics, or to a farm, where simply food, regular hours and a strenuous use of the muscles will accomplish much.

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ORIGINAL ARTICLES

SOME POINTS IN THE PATHOLOGY AND TREATMENT OF THE MIDDLE EAR COMPLICATIONS OF SCARLET FEVER AND MEASLES[1]

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It is a curious fact that in the literature of otitis media and its results, there is a somewhat unfortunate hiatus. If the ordinary text-books of medicine be consulted, the student will find therein a somewhat brief description of the ordinary variety of acute otitis due to cold, sea bathing, or injury, and in the sections on infectious diseases he will probably find only a short statement to the effect that a certain proportion of patients suffering from scarlet fever or measles develop a discharge from the ear, which occasionally becomes chronic, and is capable of retaining the infection of the original disease for a prolonged period.

When he comes to study the surgery of the head, he finds, however, a careful description of lesions, both numerous and deadly, of the temporal bone, brain, meninges, etc., which have resulted from the aforesaid otorrhea, or its neglect. If it should occur to him, that prevention in these matters might be better than cure, and he should seek for information as to its possibility, he would find in the several text-books but a silence, possibly relieved by a stereotyped sentence, evidently copied from edition to edition, which in itself merely serves to arouse his curiosity.

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[1] *The Medical Chronicle.*

It must be confessed, too, that the text-books on diseases of the ear are apt to share in this defect, as far as the otitis of the exanthemata is concerned, for the special points in which it differs from the catarrhal variety are hardly adequately brought out. It is in the attempt to bridge over this gap that the present paper has been written, and I propose to describe some of the affections to which the ear is liable in a patient who is the subject of an attack of scarlet fever or measles. The points of difference between these two diseases are those of degree rather than of kind, so the same account will serve for both.

The first point to which I will draw attention is an anatomical one, which was first mentioned by Young and Milligan in a paper read at a meeting of the Otological Society in May last, and that is that the tympanum and antrum are developmentally one and the same organ, that, to use their own words, the antrum is no more a diverticulum of the tympanum, than the tympanum is of the antrum; both being formed at the same time from a continuous cleft. They furthermore showed that, if the Eustachian tube be inflated from its nasopharyngeal end, there being at the same time a small or moderately large perforation in the tympanic membrane, the smoke or fluid employed passes at first, not through the perforation into the external auditory meatus, but into the mastoid antrum.

This helps us to understand another fact which underlies the pathological peculiarity of scarlet fever when it affects the ears, namely, that there is a great tendency for the mastoid antrum, and to a lesser extent, the mastoid cells also, to be infected along with the tympanum from the first. In a great majority of cases, the organisms—for the infection is almost invariably a mixed one—travel *via* the Eustachian tube, though in some severe attacks, where streptococci are to be found in the blood, I believe that they may be conveyed to both ears simultaneosly by the vascular apparatus.

Now, in the "ordinary" or catarrhal otitis, the mastoid antrum either remains intact, or is infected by the spreading of the inflammation from the tympanum at a later date, and then only in severe cases. One can hardly dogmatize about a disease which is so loosely defined as catarrhal otitis, but, in a large number of cases, at all events, the ear is attacked from the external meatus, and not *via* the Eustachian tube at all.

It is advisable to dwell on this distinction somewhat, as it is the key to the successful treatment of a scarlatinal otorrhea: the evidence for the correctness of this view is twofold.

Firstly, if one examines the temporal bones of patients dying in the first week, or thereabouts, of an attack of scarlet fever of the septic type, it is not uncommon to find caries of the bone in the neighborhood of the mastoid antrum and cells, where no sign of any such disease was afforded during life: there may then have been but little discharge from the ear, or even none at all. The following is a case in point:—

V. E., female, aged 22 months, was admitted to Monsall Hospital on May 16th, 1905, on the second day of an attack of scarlet fever of moderate severity. There was no previous history of any illness of note, and the mother was sure that the child never had any discharge from the ears, even whilst teething.

On admission, the patient—a healthy-looking, well-nourished infant—was evidently suffering from a moderately severe attack of scarlet fever, which presented no features of special interest. The fauces were injected, and there was a little soft exudate on each tonsil, and there was no otorrhea. The temperature was 101° F. On the third day of disease the temperature fell to normal, and remained so till the eighth day, when it rose to 102° F. For this, no cause could be found, except a trace of albumen in the urine. On the eleventh day, however, there was hematuria, with diminution of the quantity of urine passed: it could not be accurately measured. There were no signs of disease in any other organ except the kidneys: there were no symptoms of uremia. On the eleventh day of disease, the nurse reported slight twitchings of the right side of the face, and a peculiar sharp cry.

On examination, I found the right tympanic membrane markedly injected and lustreless, and it appeared to be bulging slightly. Paracentesis was at once performed, a free incision being made into the posterior and inferior quadrant of the membrane: a little blood-stained serum escaped, but no pus. The twitchings and the cry disappeared, and the child seemed more comfortable, and on the next day a little pus was present in the meatus. From this time onward, special attention was directed to the discovery of any local signs of mastoid inflammation, but without result. The child died on the eighteenth day of disease, apparently from scarlatina nephritis. I made a *post-mortem* examination seven hours after death, and found an extensive collection of pus in the right mastoid region, the antrum and cells being represented only by a single cavity lined with carious bone, and containing intensely fetid pus. The aditus was blocked by granulation tissue, and the tympanum was almost empty, containing only a little pus, which was not fetid: the ossicles were in their normal position, and were not carious.

On the left side there were a couple of drops of pus in the mastoid antrum, and about the same quantity in the tympanum: there was a small perforation of the membrane. All other organs were healthy except the kidneys, which showed the microscopical changes usually found in scarlatinal nephritis.

Secondly, this view is supported by the results of operations on the mastoid antrum in scarlet fever. It not infrequently happens that, after the otorrhea has lasted about a fortnight or so, one sees, on examination of the ear with the speculum, that there is very little granulation tissue in the tympanic cavity, and that the tympanic membrane is represented only by a few shreds. Notwithstanding the apparently quiescent appearance of the tympanic cavity, there is a large amount of fetid otorrhea. On careful examination after intratympanic irrigation, it will be seen that the pus is coming from the region of the attic, and, as might be expected, this kind of otorrhea remains unaffected by douching with even the latest variety of antiseptic. The mastoid antrum is then opened in order to secure better drainage. Under these conditions, one almost invariably finds that the mastoid antrum and cells are represented by a single cavity containing fetid pus and lined by carious bone and pale, edematous granulation tissue; in fact, there is in scarlet fever a condition which, in the case of a catarrhal otitis, obtains only after a lapse of several months, and often not at all.

This early infection, or rather, to speak more precisely, osteitis, of the antrum and cells, bears, incidentally, on an important public question, that of the etiology of "return cases," that is to say, on the occasions when a patient who has been in contact with one recently discharged from a fever hospital as "free from infection" contracts scarlet fever.

On examining the records of many such cases, I have been struck with the fact that the alleged "originating case" had frequently had otorrhea, which had ceased for a period of (at Monsall) at least a week before discharge, the tympanic membrane having shown but a small perforation, or, more commonly a recent scar. However, at an indefinite period after the discharge of the patient (perhaps most commonly two or three weeks later) otorrhea had again commenced, and within a few days, another child had contracted scarlet fever, apparently from contact with the hospital patient.

The explanation of this seemed to me to be somewhat as follows:—At the outset the antrum, and possibly the mastoid cells also, were infected as well as the tympanum, a collection of pus and carious bone had resulted, which could, by virtue of the mutual relation of the parts, only imperfectly have drained into the tympanum. With the antrum, let us say, only one-third full, there would be nothing to prevent the tympanum healing, especially if one bears in mind that the aditus is but a small opening, and is liable to be blocked with granulation tissue. When the caries in the mastoid region progressed, however, pus had formed under pressure, and had burst through the aditus into the tympanum, and thence through the membrane.

I have, quite recently, had the opportunity of operating on two cases of this description. In each, the discharge had been intermittent, and had ceased at the time of the operation; the tympanum seemed fairly normal, but one felt that the cure was only apparent, as the intermissions had been frequently followed by the discharge of a small quantity of very fetid pus. In each case the antrum and cells were found diseased, and the aditus blocked by granulation tissue. Cure, with improvement of hearing, followed the performance of the radical mastoid operation. So much for the pathological anatomy of the otitis; clinically, there are one or two points which are worth notice.

The first of these is the absence, as a general rule, of any preliminary pain, the first symptom noticed being a wetting of the pillow with pus from the meatus:—by far the larger number of scarlatinal perforations, incidentally, occur in the night time without even the awakening of the patient. On examination one finds, as a rule, a perforation which is large and in the inferior segment of the membrane. In catarrhal otitis, on the other hand, there is almost invariably preliminary pain which is commonly severe, and the perforation is often small and situated high up in Shrapnell's membrane.

The destruction of membrane proceeds rapidly, and it is not uncommon to find that organ completely gone in a fortnight or three weeks. One then sees a tympanic cavity full of granulations, and on scraping these away gently the malleus is seen to be carious and frequently dislocated upwards. Occasionally it is possible to observe, after a little cautious swabbing, that pus is coming down from the region of the attic: in the latter case, it will usually have a fetid odor, pointing to the presence of necrosed bone and imperfect drainage therefrom. As the affection progresses, the ossicles become more carious and the malleus soon disappears altogether, while the incus may be represented by small carious fragments only; the stapes, in my experience, is not attacked until a much later period, often some months after the onset of the otorrhea.

The tympanum rapidly becomes filled with granulation tissue, which may exist in one or two large masses, forming the so-called aural polypi; occasionally these may be seen, without a speculum, presenting in the meatus. Granulations, however, are not always conspicuous in the tympanum; sometimes one sees merely an empty cavity containing pus, which is found on careful examination to be proceeding mainly from the region of the attic. It is, however, much more common for the granulations to be pronounced.

These are the conditions present in the chronic otorrhea resulting from scarlet fever, which in itself is so often accepted by the relatives of the patient as the natural, and not important, consequence of the attack of scarlet fever; frequently, the deafness is not pronounced, and, if the other ear be sound, is not noticed at all. Moreover, there are not, as in catarrhal cases, Eustachian obstruction, and tinnitus, to remind the patient of the presence of disease. Very intense deafness following scarlet fever, is not, as a rule, associated with otorrhea, but is more often due to Eustachian obstruction from post-nasal adenoid vegetations, which themselves so frequently grow more rapidly after an attack of scarlet fever or measles.

Until a cerebral or cerebellar abscess or thrombosis of the lateral sinus supervenes, nothing but an otorrhea is noticed by the patient, and, on inspecting the tympanic cavity, the signs described above are all that can be seen; in fact, the progress of the disease cannot be estimated by the study of these tympanic appearances only.

Perhaps the most curious thing about the otitis of scarlet fever is the rarity of discoverable signs externally of mastoid implication (in 10,993 cases collected in the statistical report of the Metropolitan Asylums Board for 1903 signs of mastoiditis were present in only 89—an incidence of 8 per cent.) though, when the mastoid process has been opened for treatment of an otorrhea only, I have never failed to find caries of the antrum or cells. In the same series of cases otorrhea was present in 15 per cent. Why local signs should be so conspicuously absent in scarlet fever I do not attempt to explain. In influenzal cases, where the cells at the tip of the process are soon affected, the local signs are usually most distressing to the patient.

The co-existence of mastoid osteitis with the tympanic affection does not necessarily occur only in the severe cases. It is, of course, quite possible for the mastoid inflammation to heal without operation; probably obliteration of the antrum and cells takes place, and the mastoid process becomes filled with new bone of a dense ivory-like consistency.

As stated above, an apparent cure of a scarlatinal otitis is often somewhat delusive, as it is so apt to relapse, but, apart from this, a permanent recovery without operation occurs in about 60 per cent. of all otorrheas, in periods varying from a fortnight to three months. I am, personally, very doubtful whether the condition ever recovers after this period without an operation.

Before discussing the treatment of the otitis of scarlet fever, it is necessary to see whether it is not sometimes possible to prevent infection of the ear at all. In the more severe cases, especially when the otitis appears early and is present on both sides, we have no evidence that any method of treatment of the patient, either generally or by local applications to the fauces will prevent its occurrence, but in the milder cases it is necessary to remember that where adenoid vegetations are present, and free drainage of the naso pharynx through the nose is impossible, otitis is almost certain to occur. In these children, the otorrhea often does not appear until the third week of the disease or later, while the faucial inflammation has sufficiently subsided to permit of the removal of the post-nasal growths, without inconvenience, at the end of the first fortnight. At or about this period, therefore, it is best to remove adenoid vegetations whenever they are found to be causing nasal obstruction. It is as well to leave the removal of hypertrophied tonsils until the third or fourth week as a routine practice, though I have frequently amputated these organs at the height of an acute faucial inflammation with advantage when the obstruction has been extreme. Whenever adenoids are causing obstruction while the fauces are the site of a severe septic ulceration, they should undoubtedly be removed, as their presence only serves to prevent the healing of the throat; moreover, they are themselves generally in a necrotic condition.

Then, I am convinced that the daily use of the nasal douche to the nose and throat in the acute stage of scarlet fever tends to the prevention of otorrhea. The essentials are, however, that the instrument itself shall be incapable of conveying infection, and for that reason a Higginson or any other form of rubber syringe is inadmissable, as adequate sterilization is impossible. Then the flow should be gentle; in practice the douche can should be at a height of about two feet above the patient's head. It does not much matter what fluid is used, so that it be not strongly antiseptic. Personally, after trial of, I should imagine, nearly every antiseptic on the market, I have come back to the use of sterilized water. Normal saline solution, flavored with a little "Sanitas fluid" is also good.

It is also necessary to attend to any condition, such as carious teeth or stomatitis, that is keeping up a septic condition in the mouth. Carious teeth should be extracted in the acute stage of the disease, and the mouth thoroughly disinfected by swabbing.

When once the otitis arises, the first point is to make sure that the perforation of the membrane is large enough to afford adequate drainage. It is very rarely indeed that the opportunity presents itself of performing paracentesis before a natural perforation occurs, but it is often necessary to enlarge the latter subsequently, and, as the process is not painful as a rule, there is no difficulty in the matter.

Having obtained free access to the tympanum the ear may be douched at first with sterilized water or any mild antiseptic, later with lotions of increasing astringency, such as chinosol 1 in 4,000 to 1 in 2,000, biniodide of mercury 1 in 4,000, sulphate of zinc gr. 1. ad ℥i. gradually increased to gr. 5, et hoc genus omne. Alcohol, of increasing strengths, is often useful in the later stages. Intratympanic irrigation is sometimes advantageous, and in scarlatinal cases with large perforations is not usually difficult. Under this sort of treatment the otorrhea will often clear up in from a fortnight to a month.

When the otitis has lasted for a month without improvement under intratympanic treatment, adequate drainage *must* be provided, and this can only be obtained by the opening of the mastoid antrum. Any obviously carious bone can be removed from the antrum and cells at the same time, but neither the aditus nor tympanum is touched. This frequently effects a cure; the mastoid wound heals by granulation in about eight weeks, and the tympanum generally resumes its normal appearance rather earlier than this.

This procedure, or, as it is often called, Schwartze's operation, has usually been tried as a second resort after many weeks, when intratympanic treatment has obviously failed. It has been held that it is always possible without detriment to proceed to the radical operation, with removal of the ossicles, and the making of one large cavity of antrum, mastoid process, aditus, attic and tympanum, if the simple antrectomy fails to effect a cure, the idea being that there is a great risk of the radical operation resulting in complete deafness.

In this view, however, I do not myself altogether agree. I do not feel that a preliminary antrectomy does leave the hearing no worse than before the operation, and if the radical operation treatment has to be performed later on, the period over which the cure is spread is very considerably prolonged.

My own experience of the simple opening of, with removal of any obviously diseased bones and granulation tissue in, the antrum, has not been very satisfactory. Frequently, the wound in the bone has failed to heal at all, a troublesome sinus persisting, and the subsequent hearing has been far from good, and often the otorrhea has continued. In fact, the operation has sometimes been a complete failure, and the relatives have, therefore, been unwilling to subject the child to another surgical procedure; one does not, in fact, always get the chance of performing the radical operation subsequently. The reason for this is, I think, that frequently the improvement in drainage from the opening of the antrum is only temporary, the aditus soon becoming blocked by granulation tissue; as the wound in the bone can only heal by granulation it is difficult to see what there is to prevent this narrow passage becoming blocked, before the tympanic side has recovered.

With the radical operation, however, the opening in the bone remains a smooth walled cavity, which becomes covered with epithelium from the meatal flaps that have been applied to it, and the freedom of drainage, which should be made anatomically perfect at the time of the operation, persists. Provided that the stapes is left, and that the labyrinth has neither been affected by disease, nor damaged by injudicious use of the sharp curette on the inner tympanic wall, the hearing is often considerably improved. In this connection, however, I am speaking of *early* scarlatinal cases only, and my experience has not extended beyond thirty of them, but in this series there have been only two exceptions to this statement. It is difficult to avoid the conclusion that there is a tendency to the belief that the results of the radical operation are equally good at whatever period of the tympanic suppurative process it be undertaken, an opinion which I regard as erroneous, as regards the hearing after the operation. In my experience the question of the resulting power of hearing depends on the stage at which the radical operation is performed.

There is a further point in favor of the radical operation, that if the posterior wound heals by first intention, the meatal packing can be discontinued after a week, and the ear then need not be covered by any bandage, though in hospital practice, it is not advisable to discontinue this, on account of risk of infection or injury from contact with other children. The daily dressing, in fact, consists simply of gentle irrigation, and careful drying of the cavity through the meatus. Packing after the first week is inadvisable.

The method of performance of the operation is described in many text-books, and need not be referred to here. A practical suggestion of some importance I owe to Dr. Milligan, and that is to form and reflect the meatal flaps as soon as possible after the antrum has been opened, instead of at the conclusion of the operation. By this means a clearer view of the tympanum is obtained. For the operation itself, I have found as large a gouge as possible, with a flat curve, convenient, using the burr for subsequent smoothing only. The objections to the use of the mallet do not appear to exist in practice, however potent they may be in theory. There is a much greater risk of the instrument slipping in using the gouge on hard bone with the force of the hand only. Healing has usually been complete in from five to ten weeks, seven weeks being the commonest period. I have had no experience of skin grafting of the cavity, as all my cases were in patients too young for the methods to be used conveniently. It is important, as Dr. Milligan points out, to use a strong light. I have found limelight reflected from a forehead mirror the most convenient.

In my series of thirty cases, there has been one death from posterior basic meningitis ten days after the operation; a further complete exploration of the lateral sinus and the middle and posterior fossæ, temporo-sphenoidal lobe and cerebellum having failed to reach the site of the pus. It is interesting to note that this case formed an exception to the more general rule stated by McEwen, that meningeal infection occurs by direct extension from the temporal bone. In this case the dura mater and subdural space was everywhere healthy at the second operation and at the *autopsy,* there being a circumscribed purulent effusion underneath the cerebellum only; the infection was probably a lymphatic one.

In one other case the operation failed to arrest the suppuration; this was a small child of 1½ years, where the temporal bone was extensively diseased, and I hesitated to remove the bone with sufficient freedom. The labyrinth was affected at the time of the operation, and subsequently portions of the cochlea were exfoliated.

I have said that local physical signs of infection of the mastoid before operation are rare in scarlet fever. When they do occur they are often ambiguous. I have operated upon several cases, for instance, where the only sign of the disease having spread beyond the tympanum has been the occurrence of facial paralysis. In each case this ceased when the simple antrectomy had been performed. In one case, the only sign was sudden coma, and here it was a pure accident that the affected antrum was opened first, as there was nothing to enable one to determine on which side the extension had taken place. In this case, some fetid pus was found under pressure in one antrum, and the coma had disappeared when the child recovered from the small amount of anesthetic that had been given. Complete recovery followed. One may get signs of local mastoid periostitis, redness, tenderness, and edema over the mastoid process, but in these cases the antrum is not always the prime source of infection, though it may be diseased as well. The pus comes from the tympanum, through a perforated membrane, thence *via* an ulcerated hole in the cartilaginous meatus, to the space underneath the mastoid periosteum. If not evacuated, the bone may be eroded and the mastoid cells infected subsequently. In these cases, a simple incision down to bone, if the case is seen early, usually suffices.

A very large proportion of the cases which have to be operated upon in general hospitals for suppuration in the temporal bone and its results have, as I have pointed out, originated in an uncured scarlatinal otorrhea. This proportion is at least one-half. Of these patients, again, it is safe to assume nowadays that a large proportion have been "treated" in isolation hospitals, and discharged from them with running ears. For this, I feel that an undue fear of untoward consequences that may ensue from "operating" in the atmosphere of a fever hospital is largely responsible. There, as elsewhere, infection is mainly conveyed by dirty hands, or instruments, or by unskilled nursing, and not by obscure aërial influences, and if this be recognized, it is, in practice, as safe to operate in a fever hospital as in a general institution or a private house, or rather, the difficulties of ensuring asepis are no greater, or no less. That it would be advisable permanently to cure these otorrheas before the discharge of the patients there can be, I think, little doubt, and I have tried to show that the way of success lies in the application of ordinary surgical principles of adequate drainage under aseptic conditions in the patient and his surroundings, as soon as it is certain that the otorrhea will not yield to intratympanic measures. On this point an accurate diagnosis is usually possible, as I have said, in a month to six weeks after the onset. At this stage the radical mastoid operation appears, as far as my experience goes, to yield better results as regards subsequent hearing—the sole deterrent to the radical procedure—are better than those usually obtained when the operation is postponed until the patient has been discharged from the fever hospital, and after a varying, but often considerable, interval, has presented himself at the ear department of a general or special hospital.

"UNE GOUTTE DE LAIT"[1]

By A. Dingwall-Fordyce, M.D., F.R.C.P.,

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On the 20th October last there was opened in Paris the First International Congress of the "Gouttes de Lait." Comparatively small in number, its members nevertheless included—in addition to representatives of practically all European nationalities—representatives from Egypt, St. Petersburg, and North and South America, who had come especially to Paris to attend the meetings of the Congress. Its duration was but for two days, and was prolonged for other two by visits to institutions of the same suggestive name in Rouen, Havre, and Fécamp. That the actual management of the Congress was a marked success was admitted on all hands; while never was French charm and tact more evident than in the kindly consideration and sumptuous hospitality which ensured the comfort and pleasure of all visitors.

Many interesting papers were read, and many heated discussions took place, and the different methods of working in the various countries were fully discussed; while the importance and success of the meeting was proved by the unanimous agreement to have a second Congress in the near future.

To many English physicians the words "Goutte de Lait" convey little beyond what their strict interpretation implies, and, unfortunately in our own country of Scotland the number of "Milk Depôts" is still so small—and, might one add, their value is so little recognized by great numbers of the medical profession—that the value of the work being done abroad, and the importance attaching to it, is but ill realized.

The valuable work of M'Leary at Battersea, and his most instructive book on "Infantile Mortality and Infants' Milk Depôts," have done much to encourage such institutions in this country, and one cannot but hope that as a result of this International Congress a much greater impetus may be given to the realization of their importance, and the formation of similar institutions throughout the land.

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[1] *Scottish Med. and Surg. Jour.*

That it should be necessary to provide on a large scale for the artificial rearing of infants is doubtless regrettable, but in the economic and social conditions prevailing in the present day throughout practically all civilized countries, this question undoubtedly is one which has to be faced.

In many maternity institutions—notably that of Professor Budin in Paris—the nourishment and progress of the child are carefully watched and regulated for months, and even years after the mother leaves the hospital. In such cases, naturally, breast feeding is the rule, and of the infants in Professor Budin's clinique, 60 per cent. are brought up wholly on the breast, 34 per cent. on mixed breast and artificial feeding, and only 6 per cent. wholly on artificial feeding.

Such cases, however, form a small minority of the birth-rate in a city, the great majority of women having their accouchement in their own home, and many of them, owing to their multifarious duties, having extremely little time to spare for child-bearing or child-rearing.

For such cases, where breast-feeding, for one reason or another, is entirely out of the question, or where it can only partially be employed were the "Gouttes de Lait" formed.

Thanks to them, the infant is at least assured of a clean supply of nourishment in reasonable quantities and, if the instructions handed to each mother are sensibly acted on, the institution also acts as an important educational center.

In the Hôpital des Enfants at Paris there is a crêche for children under one year of age who are seriously ill. Attached to this there are always several nursing mothers so that when possible human milk is given to the children and otherwise they are given sterilized milk. Despite the utmost care and attention, the mortality of this portion of the hospital never sinks beneath the appalling figure of 50 per cent., undoubtedly owing to the massing together of numbers of infants all seriously ill. The results in the various "Gouttes de Lait" throughout the city are very markedly different.

In all these institutions sterilized milk is used, the degree of sterilization, however, varying, as in some the milk is raised to a temperature of 110° Centigrade, and in others to 102° Centigrade.

Dr. Variot at the Belleville Dispensary uses milk which has been sterilized at 110° Centigrade for three-quarters of an hour. Caramelization occurs at a temperaure of 105° Centigrade, and consequently his milk is of a distinctly brownish color. The milk is sterilized at the dairy and brought daily to the dispensary for distribution; while once a week all infants have to be brought to the dispensary, weighed, and personally examined by the physician. Despite the very high temperature at which the milk is sterilized, Dr. Variot states that he has never known of a case of scurvy or rickets caused by it.

He commences with a modified milk of two parts of milk to one part of water, and gradually decreases the amount of water, while his bottles are of various sizes corresponding to the quantities of food suitable for infants of varying ages. With a clientele or some 250 infants the weekly examination is no light task.

At the Havre Institution Dr. Caron uses milk sterilized at 102° Centigrade for three-quarters of an hour, and he commences the very youngest babies with pure milk in very small quantities and gradually increases the amount given. Should a very young baby be unable to take this pure milk, the mother is instructed to add a definite quantity of water to each bottle. This latter method is obviously open to severe criticism, owing to the impossibility of ascertaining that the correct quantity of water is used, and also to the probable use of imperfectly sterilized water.

At Rouen for his "Goutte de Lait," Dr. Brunon obtains the milk from a model dairy where the milk is sterilized before being brought into the town. At this dairy extreme care is taken in the cleanliness of the animals, and also in the cleansing of the udders previous to milking; but one was surprised to notice that the same cloth and pail of water were used for cleansing one cow after another! It also seemed curious to learn that it was considered necessary to keep the cows indoors practically all winter!

Needless to say all the cows had passed the tuberculin test.

Dr. Dufour at Fécamp also uses milk sterilized at 102° Centigrade for three-quarters of an hour, and divides his patients into three classes: (1) those who get their milk free; (2) those who pay a very little; (3) those who pay the full price.

This institution, one of the earliest in France, is also one of the most complete.

In several of the country institutions in France the milk is merely pasteurized; but in the towns pasteurization is not found sufficient.

In New York, on the other hand, in the Depôts of Nathan Straus, the milk is pasteurized, being kept at a temperature of 167° Fahrenheit for 20 minutes. Modified milk is used here, and no bottle is sold 24 hours after pasteurization, while the bottoms of all bottles are rounded, a device I noticed in none of the French Depôts.

As showing the value of the work of Nathan Straus in New York, I may quote from his paper laid before the Congress. He said: "The constant increase of the scope of my work can best be seen from a consideration of the following figures:—

"In 1893, 34,400 bottles were dispensed. During the present year, 2,668,397 bottles have been dispensed, and 1,016,731 glasses of pasteurized milk drunk on the premises. Its results can be more eloquently told by the statistics of the Health Department than by any words of mine. These statistics show that the death-rate per thousand of children under 5 has gradually decreased from 96.5 per thousand in 1891 to 63.0 per thousand in 1904."

In Belgium, sterlized milk depots are very numerous, while in many towns in Germany it is essential to have a municipal "Goutte de Lait."

In France these institutions are mainly managed by philanthropic societies, while in England almost all are managed by the municipal authorities, and in our own immediate neighborhood we are fortunate in having the muicipal depôt of Leith.

To anyone seeing anything of the manner of nourishment of young infants of the poorer classes, the value of a clean, well-regulated milk supply cannot but be obvious. That the method of sterilization and the percentage composition of the various milks distributed by different institutions vary very largely, serves merely to bring into greater prominence the great value of a clean milk, in moderate quantity and at regular intervals; and to whom should we look if not to the municipal authorities for the providing of this supply? Our water is rigorously tested, and why not our milk, which is surely of equal importance with it.

Undoubtedly it is asking too much to expect the medical officer of health to provide for this certified milk, and at the same time to superintend the management of all babies fed on it. Occupied by other important duties, his time does not permit him to do so, and circumstances do not require it of him. For healthy infants his supply of milk and his supervision are all important, and should be readily obtainable; while for sickly infants requiring more time and attention, the hospital, private, or above all, dispensary doctor is obviously the most suitable guide.

The great difference between the working of the French "Gouttes de Lait" and the British Milk Depôts consists in the degree of medical supervision, and given a satisfactory supply of certified milk, it must of necessity rest with the general body of medical practitioners, and more especially with physicians for children, to control and supervise the distribution of this milk.

NOTES ON THE TREATMENT OF DIPHTHERIA.*

By T. Basil Rhodes, M.B., B.S.Durh.,

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Mr. Chairman and Gentlemen:—I regard it as an honor and a very great pleasure to welcome you this afternoon and to have been asked to read this paper before you. I will preface my few remarks by saying that I am not desiring to speak in any way didactically or dogmatically, but am merely describing as far as possible my own line of treatment in regard to such cases of diphtheria as come under my care, in the hope that what experience I have had in this particular branch of medicine may be of use to some who do not have the opportunity of seeing numbers of cases.

With your permission I will take as my text a passage from my report for 1904, which is incorporated in the annual report of Dr. Niven, Medical Officer of Health for Manchester. This reads as follows:

"May I take this opportunity of urging the necessity for the early administration of antitoxin in a sufficiently large dose in any case *suspected* of being diphtheria without waiting for the result of a bacteriological examination? My own view is—and I believe it to be the practice in many fever hospitals—that in any ordinary case of faucial diphtheria, if antitoxin (2,000 units) be administered on the first day of disease, or 4,000 units on the second day, there is little or no danger for the child, provided always that care is taken subsequently in the matter of rest and other general treatment. In this latter connection I may say that I recently had a patient brought in that had been ill with suspected diphtheria for five days; croupy cough began on the fourth day; antitoxin (2,000 units) was then given, and when the ambulance arrived next day to fetch away the child, she was found fully dressed, playing about in the bedroom. When she reached

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*Read before the Altrincham Division of the British Medical Association. *Brit. Med. Jour., Feb.,* 1906.

the hospital she was very collapsed and the croupy cough was very distressing.

"If antitoxin—4,000 or 6,000 units—is administered on the third day the case will probably proceed to a favorable recovery, though a second dose of antitoxin may be found necessary. On the fourth day, as a rule, 8,000 units may be necessary. On the fifth day it is, in my opinion, well to give a moderate dose, such as 6,000 or 8,000 units first, and repeat the same six or eight hours later. On the sixth day the child is usually so toxemic that antitoxin will hardly overtake the disease. (I consider that the advisability or not of intravenous injection of antitoxin is still *sub judice;* there is little doubt, however, that antitoxin given in this way acts more rapidly than it would do if injected subcutaneously) ; but small doses, say 4,000 units, given repeatedly are, I think, best in these cases.

"The medical man who gives antitoxin, even if only 2,000 units, to a case suspected of being diphtheria, before sending the same to hospital or sending a swab for examination, very often saves the life of a child by avoiding delay.

"In the case of laryngeal diphtheria, especially if the infection has spread from the nostrils or naso-pharynx, even greater haste in administering antitoxin is needed, two days often sufficing to render the case practically hopeless.

"I should like to add that I do not think that diphtheria antitoxin ever does any harm. The only patients who seem to suffer much inconvenience from it are adults, who occasionally have rather severe urticarial and joint pains, and sometimes even a definite and multiple arthritis. Fortunately, however, most adults, unless the attack is a severe one, get over it without the necessity for antitoxin arising."

First, then, the word "suspected" is, I think, important. One so often gets a case of diphtheria into hospital late on in the disease, because the doctor has waited for the result of the examination of the swab. And the important point to my mind is, *not* that the case was not sent to the hospital (for that opens up a very difficult question—the general practitioner quite justifiably being averse to sending in a case as diphtheria which may be sent out in a day or two as wrongly diagnosed—and the parents on the other hand being unwilling to let their child go to the hospital on a mere "suspicion" of diphtheria) but that antitoxin in a small dose was not administered at once—without waiting for confirmation from the bacteriological experts, when the time for the usefulness of antitoxin in that particular case has probably passed.

Such cases as have definite membrane on the tonsil or tonsils, or that have profuse thick nasal discharge are easily recognized and are usually treated very soon; but I firmly believe that many cases that eventually end in death or develop subsequent paralysis or other serious complication, were when first seen cases of diphtheria without definite membrane, but with some such slight signs as swelling and matting together of a few glands on one or both sides of the neck, accumulation of mucous discharge in the naso-pharynx perhaps visible running down the back of the pharynx, perhaps showing itself by a slight nasal discharge, or even being indicated by simply dryness or soreness of the external nares or the skin below nostrils; and I believe that if diphtheria had been "suspected" in these cases, and a small dose of antitoxin had been given, all symptoms would have disappeared or have been modified in a very short time—whereas later, when the case became obvious as one of diphtheria, the patient is so full of toxemia that antitoxin, even in large doses, is often too late.

Similarly in laryngeal cases—while recognizing that all "croup" is not diphtherial, yet I think that if a careful examination were made for the less obvious signs of diphtheria in every case of a young child found by the medical man to be suffering from some apparently slight and ill-defined illness, diphtheria would be more often suspected of being the cause; and. if a small dose of antitoxin was given, that attack of "croup" which is apparently "primary" but which is, in my opinion, not infrequently "secondary," would be avoided.

I do not imagine that there are very many medical men at the present time who do not believe in the value of antitoxin in diphtheria, but I know that there are a few such. Some of the disadvantages alleged against its use are:

1. The causing of an abscess at the seat of injection. I believe that cleanliness will almost entirely prevent such unfortunate occurrences; and if in addition one is careful not to inject antitoxin which does not look clear when seen in the phial, and if one uses a needle with a fairly large bore (in order to avoid injury to the tissues caused by a thin stream of serum injected with great force), and injects the serum very slowly into the

subcutaneous tissue of a part of the body where the skin is fairly loose—for example, the lower part of the abdomen—I think that the chances of forming an abcess are infinitesimal. In addition to these precautions—in order to avoid drawing into the needle anything from the outside air (and, incidentally, with a view to saving the point of the needle)—I always use a blunt-ended needle for drawing up the serum into the syringe, afterwards fitting on the sharp needle, turning the syringe upward, and driving the serum up to the very point of the needle before commencing to administer the antitoxin.

2. The causing of rashes. These are often very irritating, and are sometimes accompanied by constitutional symptoms that are certainly unpleasant, though not, I think, in any way dangerous to life. I do not hold a brief for any firm, but I cannot help saying that I have found the antitoxin supplied by Messrs. Burroughs, Wellcome and Company very good in this respect, and I have had very few rashes indeed and only one abscess since I commenced to use their serum.

3. The causing of paralysis. I do not believe that diphtheria antitoxin ever causes paralysis. I do not recollect a single case where paralysis has occurred in a case of ordinary faucial diphtheria in which antitoxin has been administered on the first, second, or third days. Dr. J. T. C. Nash, Medical Officer of Health for Southend-on-Sea, in a prize essay, The Treatment of Diphtheria, published in the *Practitioner* of April, 1905, says. " . . at so late a stage in this disease, only a modified advantage could accrue (Dr. Nash is speaking of desperate cases seen late in the disease) for the following reasons: A large amount of toxin has already entered into combination with nerve or other tissue cells. Clinical experience seems to support Ehrlich's '*seittenkette*' or 'side chain' theory of immunity. The great object of specific antitoxic treatment is to forestall the toxins and prevent them from combining with the body cells. When once toxins have combined with the tissue cells antitoxin has but little neutralizing effect on these particular toxins. The late administration of antitoxin will, however, prevent the further absorption of toxins which, in severe cases, are still in rapid process of formation in extremely large quantities."

To this view I add my humble endorsement; and I have for the last year or two shaped my course, in regard to the need for further doses of antitoxin in particular cases, upon this idea and upon the conclusion I have come to that diphtheria antitoxin requires about six to eight hours before coming into active and useful play.

I may add that I have also administered diphtheria antitoxin in nearly all severe cases of scarlet fever that have been under my charge during the last two years, with results that have surprised me by their excellence, and I have never seen the slightest sign of any paralysis whatever in such cases; nor have I ever known paralysis follow the injection of small doses of antitoxin given as a prophylactic to persons who have been in contact with diphtheria cases.

With regard to my view that enormous doses of antitoxin are not always better than small doses in bad cases of diphtheria, I may say at once that Dr. Rolleston, in a splendid paper on diphtheritic paralysis, published in the *Practitioner* of November, 1904, advocates, if I read him aright, large doses, and says this is still the practice in most, if not all, of the fever hospitals of the Metropolitan Asylums Board. I can only say that my much smaller experience has led me to abandon the use of large doses in favor of repeated small ones, but I do not wish to set my opinion against that of observers of such great experience; my only motive for advocating at this moment the use of smaller doses is that I am convinced that in the great majority of cases a small —even a very small—dose of antitoxin will do great good—the amount of good that it will do naturally decreases rapidly as each day passes from the onset of illness; whereas, if it is always insisted upon that very large doses are essential, the difficulties of administration and the difficulties of cost will make its use by the general practitioner almost impossible. For few men in general practice will feel it their duty to spend such sums as two or three pounds, which may never be refunded to them, in the doubtful hope of giving some child any advantage further than it can obtain by being removed to hospital twelve hours or twenty-four hours later, but many would, I believe, give one phial of the serum, if they had it with them, if they were persuaded that even that small dose might be sufficient to hold the disease at a standstill until the child could be brought to a hospital.

So convinced am I of the value of small doses of serum, even if the case is not seen by the medical man until late in the disease, that I have suggested to a certain firm that they should manufacture and place on the market a small case containing:

(*a*) A syringe about twice the size of the small hypodermic syringe in common use. This would hold just one phial of antitoxin=2,000 units.

(*b*) One phial of antitoxin diphtheriae=2,000 units.

(*c*) One blunt-ended needle for drawing up serum into syringe.

(*d*) One needle of medium-sized bore for use in injecting the antitoxin.

(*e*) One needle (or more) fine, ordinary hypodermic.

(*f*) Tabloids of certain drugs used for hypodermic injection.

The syringe and accessories will, of course, require sterilizing after use, just as, in reality, the ordinary hypodermic syringe does. Needles for hypodermic injection of a size to fit the syringe could still be bought "by the dozen" if preferred, and doubtless an extra supply of the serum needles could also be cheaply obtained.

This syringe would, I think, remove one of the chief reasons why antitoxin is not always given by the medical man as early in the case as might be, for he would always have his syringe and a small supply of antitoxin with him. I believe that it would be found that in many places the local governing bodies would gladly supply fresh phials of antitoxin to replace those which have been used for injection.

And now, if you will allow me, I will bring to your notice a method of administering antitoxin which I use myself, and which I think may be found of advantage, especially in private practice. It is often difficult to get the child properly held—the mother naturally wishes to let go when the child cries at the pain of injection—it is often difficult to overcome the fright of the child. By the method I wish to describe both these difficulties are almost abolished; the child rarely cries much, and then only when the operation is practically finished, and the only assistance required for holding the child is such as can be given by one person who may be quite ignorant of nursing or medical knowledge.

I give the injection in the lower part of the abdomen on the left side. The skin is, of course, well washed at the site of injection, and some antiseptic is used after the washing; the syringe, plunger, and needle are boiled, and other necessary precautions with a view to asepis are taken. The child lies on his back; the arms are placed above the head; the abdomen is uncovered. One then sits on the edge of the bed, on the right side of the patient, sitting close in to the patient's right axilla, and facing the patient's feet. The child, if old enough, is then told to put his arm around one's waist. Leaning across the child one then puts one's left elbow on the bed beyond the child, close in to the left axilla. Resting the little finger of the left hand upon the left anterior superior spine of the ilium of the child, one pinches up with the thumb and first finger a good-sized fold of the skin of the abdomen in the spot prepared for injection, and with the right hand thrusts the needle (attached to the syringe already containing the serum) well into the subcutaneous tissue. A little mild deception of the child helps, for the child cannot see what is happening. I usually say, "Now, when I say 'one, two, three,' it's all finished;" and then, having said "one," I plunge in the needle and start talking to the child about listening for "two, three." Afterwards I inject very slowly, and the child hardly feels any pain at all. The assistant during this time has been kneeling at the left side of the bed with arms stretched across the legs of the patient.

Some advantages of the method appear to me to be as follows:

1. One assistant only required, who merely holds the legs of the child. The child cannot struggle, and so cannot get bruised or hurt in any way.

2. The child, being imprisoned between the left elbow and body of the administrator, is unable to move at all—or, at most, can move the hips a little. But the little finger of the left hand placed on the ilium prevents much movement, and communicates the amount of any movement there may be to the administrator, who regulates then the position of the syringe and needle held in the right hand. I never use the "rubber tubing" usually supplied with serum syringes. I consider that it is clumsy and in the way. I have never had the misfortune to break a needle, or have a needle slip out after once being inserted under the skin, when giving antitoxin in the method above described.

3. The child cannot see what is being done and rarely cries until the needle is inserted, and then is easily soothed as a rule.

4. The child cannot get his hands to the site of injection during operation.

5. The skin of the abdomen is loose; if one pinches up a good big fold one runs no danger of going into the peritoneum, and the method of holding the child prevents spasmodic jerking of the body. The pain of the injection is very slight, serum, if given slowly, being absorbed very rapidly in this position.

In addition to the administration of antitoxin, the treatment upon which I rely consists chiefly in:

A. *Local Treatment.*—Douching the throat repeatedly with boracic acid solution; douching the nose with a like solution if there be any sign of nasal discharge or soreness of the nostrils; swabbing the throat with a solution of bicarbonate of soda, one teaspoonful to a pint of water.

I use boracic acid solution instead of stronger antiseptics because the children seem to be less upset by it, and it does not cause the mouth to become as dry as some other lotions do. The swabbing with bicarbonate of soda solution is done chiefly in order to assist in moistening the mucous membrane of the mouth. If the child does not stand douching well I sometimes swab the mouth with weak carbolic acid solution, but I do not often resort to this, preferring above all things not to upset the patient too much.

B. *Rest.*—This is of the highest importance. If a child is refractory, I find that raising on to blocks the foot of the cot usually has the effect of quieting the patient, and at the same time assists the heart in its work. I am in favor of very great caution in allowing a patient, even after an apparently mild attack, to sit up. The usual practice I follow is to keep the child lying in bed *without pillow* (unless very uncomfortable in that position—a much rarer occurrence than one would expect) for at least a fortnight; then one pillow is allowed for a week, and then, if all goes well, two pillows for another week, and three for a subsequent period of five or six days; the patient is then allowed to sit on a couch each day, and about four days later is allowed to get dressed and walk a little.

I believe that it is only by extreme caution in gradually accustoming the patient who has diphtheria to the upright position that the terrible catastrophe of "sudden heart failure," of which we have all heard, and which some of us have doubtless seen, can be avoided. The periods of time I have mentioned are merely a basis of action; some patients have unfortunately to remain in the prone position for considerably longer. I judge chiefly by the character of the pulse; a soft pulse usually holds me cautious, and the pulse that often varies in time or strength generally deters me from allowing any change from the prone position for a considerable time. The original severity of the case, the general condition of the patient, and the length of time ill before receiving antitoxin, are all points that should, I think, weigh with one in deciding.

After the first few days of the disease I am very chary of ordering aperients for children. I believe that they sometimes bring on vomiting, which may be very difficult to control. Enemata, if practicable, are better.

I do not give iron in the early stages, though I consider it most useful later on: It makes the mouth so very dry that I think its value constitutionally is entirely nullified in the early stages of the disease by the extreme discomfort that a parched dried mouth and throat cause to the child.

On the treatment of complications I will touch very briefly:

(*a*) *Paralysis.*—In the paralysis which affects the various muscles of the limbs, the eyes, the pharynx, etc., I rely almost entirely upon complete rest of the whole body, and, where possible, of the particular muscles affected, and upon strychnine. In paralysis of the soft palate, with regurgitation of liquid foods, I have found that a jelly made of milk and isinglass, with brandy added, if thought necessary, and sweetened according to circumstances, is much appreciated by the children, and is swallowed easily. It is very rarely indeed that I have to resort to nasal feeding, which upsets the children so much, and causes them often to struggle violently.

In those cases where the heart is apparently failing rapidly—cases in which there is often also uncontrollable vomiting—hypodermic injections of strychnine (gr. 1-30, or more) are, in my opinion, valuable; but I agree very heartily also with those who say that brandy is of very great use in these cases. If rectal feeds can be retained, I order them, giving about two or three ounces of peptonized milk and two or three teaspoonfuls of brandy in each, but never at an internal of less than four hours. If rectal feeds are not retained, I rely upon subcutaneous injections of brandy (about 20 minims) and strychnine alternately. So long as the heart is acting at all, I believe that there are nerve fibers still in such a condition that the administration of strychnine may help the heart to continue its work until its "hour of darkness" is passed.

(*b*) *Rheumatism—Arthritis.*—I have included these as complications, in deference to the opinion of some who regard them as really due to the toxin rather than the antitoxin of diphtheria. My own belief, however, is that they are always due to the antitoxin. I have never met with them in any case of diphtheria to which antitoxin had not been given; they are usually unaccompanied by any marked rise in temperature, though occasionally the temperature does rise to 102° or 103° F., and in one case reported recently to me by a general practitioner the temperature rose to 106° F. during the attack of arthritis, and my informant regarded this case as one caused by the toxins, though antitoxin, I find, had been given; other constitutional disturbances are not usually present in marked degrees; and finally—in my opinion an important point--the rheumatism is rarely affected by such drugs as salicylate of sodium or sodium and potassium bicarbonates, but usually yields quickly to purely local treatments, of which the best is, I think, the evaporating lead lotion or the lead and opium lotion.

With regard to the treatment of laryngeal diphtheria, whether primary or secondary, I do not wish to say much, seeing that my experience of such cases is comparatively small. I confess, however, that I am very much averse to doing the operation of tracheotomy until it is quite obvious that it is an urgent necessity. The shock to the child is often very great, even if, as is my almost invariable practice, no chloroform is administered, and sometimes a patient will collapse, for no apparent cause, during the operation, even if rapidly done. I believe that hot fomentations over the larynx, combined sometimes with the inhalation of steam impregnated with some such material as tinctura benzoini co., and the administration of stimulants, of which I think brandy is the most efficacious, will often carry a child through until the antitoxin can do its good work. Having always latterly done tracheotomy, when it was required, by the "rapid method," trusting more to the sense of touch in the first finger of the left hand than to the sight—it may be that the feeling of confidence that the trachea can be opened at a moment's notice has led me to leave cases with laryngeal obstruction without operation in many instances where I should formerly have felt called upon to operate. Whatever the cause, I know that a number of cases that I had with such obstruction have got better without operation, though some were so near to it that I stood for a considerable time beside them with a knife ready to my hand, while my feeling at the time was that the shock from the operation in each case would have been just sufficient to turn the scale against the patient.

What little experience I have had of intubation has led me to abstain from its use, but I believe that in a few cases, intubation, if done by a skilled man (with a long finger), would probably be of great value. The subsequent nursing of a child with an intubation tube in its larynx is often a matter of very considerable anxiety, and I do not think that a medical man in general practice would find it very safe to be far away from his patient for long.

It is probable that inexperience in the compilation of papers on scientific subjects militates greatly against my expressing myself as clearly and concisely as I could wish, but, if you will permit, I will briefly summarize my points as follows:

1. I believe that the very slightest excuse should be sufficient for the diagnosis of diphtheria in a child; my opinion is that even so slight a sign as dryness or a parched appearance of the external nares in a child who seems poorly is sufficient to indicate that in most cases the manufacture of diphtheria toxins is going on probably in the naso-pharynx.

2. That diphtheria antitoxin never does any harm to a child, but rather that it will assist in curing illness due to "something wrong in the throat or naso-pharynx" in many cases, even if that illness is not actually due to diphtheria.

3. That, supposing the case to be one of diphtheria, as proved subsequently by the appearance of obvious signs and symptoms, the time lost by delay in giving the antitoxin is often sufficient to render the chance of recovery very small.

4. That, though many experienced workers in the field of infectious diseases insist that very large doses are much more efficacious than small ones, sufficient stress is not laid on the fact that small doses, even though given late in the disease, will often just turn the scale in favor of the patient, or at least assist the

patient to fight the disease and hold it in check until arrival at hospital, where more antitoxin may be given.

5. That, finally, if every general practitioner would carry a syringe and one phial of antitoxin, much more antitoxin would be given before the child was removed to the hospital; the necessary delay in getting the antitoxin at present, and the difficulty sometimes in obtaining it, especially in country districts, being possible causes why this treatment is not adopted immediately in all cases.

CHRONIC DYSPEPSIA IN OLDER CHILDREN.*

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Of the whole number of out-patients at this hospital above the age of two years I believe at least half are brought owing to a failure in the digestion of food and a consequent diminution in general health. A chronic indigestion is not in these children of the same serious importance as in the younger infants, for it does not lead to the atrophy of the mucous membrane of the digestive tract, which is the cause of the fatality in infants; but, on the other hand, it stunts their growth, renders them liable to a number of diseases which a more healthy child would escape, and causes an amount of suffering which it is hard to estimate.

The causes of the condition are varied. That which is most obvious, and most easily remedied, is a carious condition of the teeth. The teeth of the children of large towns in this country are deplorably bad, and habitual neglect of them adds in many cases to the original evil. The causes of the inherent deficiency in the teeth I will leave to the dental surgeons to explain, merely mentioning here that rickets and malnutrition in infancy have much to do with the future condition of the teeth in childhood. But it would matter comparatively little if the teeth were merely decayed; when they are neglected in addition there is an accumulation of foul and putrid material in the mouth, which has a most harmful effect upon the tissues and functions of the digestive tract.

In the next place associated with the chronic indigestion is a chronic hypertrophy and catarrh of the lymphatic tissues of the fauces and pharynx. Sometimes one is tempted to believe that this condition is brought about chiefly by the neglect of the teeth and gums, and the consequent slow poisoning of the lymphatic tissues, but in other cases it appears that these tissues are themselves deficient in powers of resistance, and that the hypertrophy of the tonsils and follicles arises from causes with which we are not as yet familiar. I need only remind you in this connection of those cases of sudden death in well-fed and well-developed infants, in whom is found at the post-mortem examination hypertrophy of the lymphatic structures throughout the body. Whatever the immediate cause of the hypertrophy, it is certain that it is found in association with chronic indigestion in a large number of cases, and that attention to the improvement of the condition is a chief factor in successful treatment. But the main cause of indigestion in these children is certainly unsuitable feeding. Among the children of the well-to-do the food is often too rich, and too little care is exercised both as to the quantity and the regularity of the meals. In out-patients at the hospital there is more usually a deficient quality of food, and an excess of carbohydrates, while at the same time tea and sugar form an additional portion of the diet, taken in the intervals of the more regular meals.

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*A lecture delivered at the Hospital for Sick Children, Great Ormond St., London.

However, when we have reviewed the possible causes of indigestion we are forced to recognize that there are a considerable number of children whose digestions are not normal—who cannot, that is, assimilate thoroughly the ordinary materials of a healthy child's diet—and it is in these cases that the greatest difficulty is found in treatment. It is no longer the custom to talk of hereditary diathesis; but in these children there are obscure metabolic processes which are not obviously related to the physical conditions or to the nature of the food, and though we do not now speak of the gouty or scrofulous diathesis, it is necessary to recognize that there are conditions, both hereditary and acquired, as for instance, following diphtheria or typhoid fever, of which we cannot even guess the causes.

Leaving these speculations, we must study the clinical symptoms of children who are the subjects of indigestion, and here we are confronted by manifestations of the most varied character. One symptom alone is constant, and that is the failure to grow, or, in the usual words of the mother, the failure of the child to "get on." The children are always thin and wasted, their muscular development poor, their skins dry and harsh, and usually show a considerable degree of anemia. They are often round-shouldered, with flattened chest and protuberant abdomens; they are easily fatigued, both physically and mentally; they are drowsy by day and restless and sleepless by night; their appetite is capricious, at times ravenous, at others there is absolute anorexia. Their bowels are sometimes perfectly regular and normal, more often irregular, with alternate diarrhea and constipation. In some cases there is a large quantity of mucus passed in the stools, a point to which I shall recur. So much for a general picture of the disease; some particular symptoms must be described in greater detail.

In the first place one is often told by the mothers that the children have "fits" of pallor, or "fainting fits" as they are sometimes called. The child does not lose consciousness, but quite suddenly turns white and is collapsed for some seconds and then slowly regains his natural color. What these attacks are it is impossible to say, but it has been suggested that they are closely related to epilepsy, and are the result of a general vaso-motor disturbance originating in the cerebral centres. Apart from their general significance they are not of great consequence, but it is important to realize that they do not imply any lesion of the heart, although in some cases the heart rhythm is found to be irregular and the cardiac area of dulness slightly increased. The mention of epilepsy brings to mind the fact that sufferers of *petit mal* are not infrequently the subjects of indigestion, the chief symptom in their case being a sudden attack of abdominal pain, occasionally accompanied by vomiting, but more often not. In cases, therefore, where attacks of abdominal pain occur at frequent intervals, still more when they occur in groups, it is well to remember that they may be merely manifestations of *petit mal.* Abdominal pain sometimes accompanies the "fits" of pallor, and sometimes quite independently of any other symptom. Occasionally, no doubt, it is due to a spasm of the intestinal muscle, but more often it is probably of the nature of a chronic uneasiness, due to a distension of the intestinal tract, rather than to any acute spasm. On the whole, pain is comparatively a rare symptom in these children. So also is vomiting. In the infant any gastro-intestinal disorder is apt to be accompanied by vomiting, but in the children of four to ten years whom I am considering one finds a very considerable degree of intestinal complaint without vomiting. If it does occur at all it is at long intervals. There is, however, a type of case, which was described some years ago by Dr. Gee, in which attacks of vomiting, apart from all other symptoms of indigestion, recur at intervals; the attacks are so severe as to endanger the life of the patient. To this disease the name "cyclic" vomiting has been assigned, and it is certainly a neurosis, not a gastric disorder.

Constipation is more frequent than diarrhea; the stools are large and offensive, and consist of scybalous masses, often with portions of undigested food. Attacks of diarrhea occur at intervals, and in the case both of diarrhea and of constipation it is not infrequent to find a large quantity of mucus, which is described by the parents as "jelly" or "slime." Dr. Eustace Smith has made a special category of these cases, to which he has given the name "the mucous disease." His theory is that in certain conditions the intestines and the mucous membranes generally are stimulated to an over-production of mucus; that this prevents digestion of food, promotes constipation, and provides a convenient breeding-place for the worms which are so often present in these patients. This theory serves to explain the appearance of some of the symptoms, but in many cases of chronic indigestion there is no evidence of the presence of an excess of mucus.

When there is diarrhea it often occurs in a peculiar fashion. One will be told that the child can never eat any food without at once having a loose motion. The nervous and muscular mechanism of the intestines is in so irritable a condition that the presence of food in the stomach at once sets up peristalsis in the intestine, with the result that the food is hurried through in an undigested state, and no doubt tends to increase the irritability of the mucous membrane. This form of diarrhea, which is not uncommon in children of from four to ten years, is called "lienteric dirrhea." It is fortunately, as a rule, amenable to treatment, a small dose, 1 to 2 minims, of Fowler's solution, given three times a day, usually correcting the tendency at once. If Fowler's solution fails to produce the desired effect, recourse can be had to opium, bismuth, and an extremely restricted diet for forty-eight hours, in order to give as much rest as possible to the intestine.

In many of the cases of chronic indigestion there is at frequent intervals slight fever. Usually the temperature does not rise above 100 degrees, but it is sufficient to render the child miserable and fretful and the parents anxious. More rarely the temperature may rise somewhat higher, and, together with the dry, furred tongue and the presence of some distension of the abdomen, give rise to a suspicion of an attack of typhoid fever. In such cases a calomel purge is often sufficient to dispel the suspicion, and it is a remedy which is perfectly safe in the first week of the febrile attack. But the more usual course of the fever is that it recurs at intervals, the child being noticeably more ill at these periods than in the intervening times.

Among the most marked symptoms of this complaint is the occurrence of an irritating cough, which is, one is often told, worst in the morning, but is always present. It is, of course, not directly due to the condition of the patient's digestion, being caused solely by the condition of congestion and hypertrophy of the lymphatic tissue of the pharynx, and it is hardly worthy of much notice, except that it often leads to errors in diagnosis, and is regarded by many parents as an index of the ability of the doctor; if it improves under treatment, the doctor will be given the opportunity of proceeding with the cure of the indigestion; if it persists, the child will be hurried off elsewhere.

But I have probably indicated sufficiently the chief symptoms of the complaint, and I must say a few words about diagnosis. The most frequent mistake, both among doctors and parents, is to regard the children who are merely suffering from chronic indigestion as victims of tuberculosis of the lungs. It is easy to see how the mistake arises; the wasting, the cough, the ease with which the child sweats, the lassitude, and the general restlessness and irritability, are all symptoms which are met with in "consumption"; and there is often sufficient catarrh in the respiratory passages to mislead the doctor who is not on his guard. The slight attacks of fever are also a further support to the suspicion. In the majority of cases a careful examination of the lungs will reassure the doctor, and he will be able to remove the parents' doubts. A sign which is of the greatest importance in the early diagnosis of pulmonary tuberculosis is the limitation of movement of the subclavicular region on one side, or its lagging behind the opposite side. This is best appreciated when one stands behind the child and watches the breathing with the forefingers of the two hands placed upon the clavicles. If the lagging is detected, a more minute comparison of the two sides by means of percussion and auscultation will often reveal confirmatory signs, such as slight impairment of the percussion note, or crepitant rales after a cough or deep breath. But even where one finds reason to suspect the existence of a lesion at one apex, it is wise to suspend sentence until you have had a second opportunity of examining the patient after he has been under treatment for indigestion for a fortnight. The second examination should be made, if possible, unbiassed by the first, and if the former results are confirmed the suspicion of tuberculosis becomes almost a certainty. I may say here, in parenthesis, that personally I have been able to obtain no help from the use of X rays in these cases. If one takes these precautions, one finds that the number of cases which are said to be tuberculous is enormous, but that those in which that diagnosis is ultimately made are very few. With the exception of pulmonary tuberculosis, there is no other disease which is so closely simulated by chronic indigestion. Occasionally a doubt arises as to whether there may not be a tuberculous peritonitis, but abdominal examination, as a rule, quickly settles the point.

Prognosis is as a rule good; it is usually possible to correct the varied mistakes which have been made, and in a comparatively short time to re-establish the health of the patient. In a few instances treatment must be continued over many months; but the only thing which will cause any real anxiety will be the intercurrence of some infective disorder, which, acting on a constitution weakened by the prolonged malnutrition, may run a more dangerous course than it otherwise would tend to do.

The general principles of treatment are quite clear; the first indication is the removal of possible causes of the complaint—*e. g.* carious teeth or chronically inflamed tonsils; next, attention to clothing, ventilation, regularity of habits, and sufficiency of sleep and exercise; and, thirdly, the careful regulation of the diet and of the functions of the bowel. With regard to the first two points I have nothing especial to say, except that the physician must never forget that fresh air and exercise are of even greater importance to the growing child than to the adult. With regard to diet it will suffice to lay down a few general principles, and to elaborate these for each individual patient. It is probable that a considerable number of the cases of chronic indigestion are due to the irregular and injudicious meals allowed by the parents, and to the habit, almost universal at the present day of sweet-eating. Among the poorer classes in London the extent to which sweets and sugary confections have displaced the more ordinary foods is remarkable. A child who is unable to consume any breakfast is given a halfpenny by its mother and buys sweets, with the aid of which it proceeds to destroy any appetite it would have acquired for its dinner. A prolonged indulgence in this habit leads to chronic indigestion in a severe form. With the children of the better class sweet biscuits, rich pastry, jams, and chocolates often form a large portion of the diet. The first requisite, therefore, in treatment is to forbid absolutely sweets, rich cakes, sweet biscuits, chocolates and similar dainties, not only between the meals, but even at the meals. Such articles must be reserved for rare occasions. Secondly, nothing must be taken between meals, unless it be a cup of milk. Thirdly, new bread, potatoes, pickles, fried fish, and the coarser kinds of vegetable must be forbidden and lastly, all meals must be taken at stated and regular intervals. There is often some difficulty experienced in suggesting diet and a number of meals appropriate to a child of a given age, but it may be broadly laid down that after two years of age the number of meals should not exceed four in a day, and that the material should consist largely of milk and milk-products, such as rice-pudding, etc., with the addition of other articles according to the age of the child. Except for special reasons meat should not be given more than once in a day. Thus, for a chid of about six years of age the meals should be at 8 a. m., at 12 noon, at 4 p. m., and at 7 p. m., and of these the only large meal should be that at mid-day, while the last meal should be nothing more than milk or bread-and-milk. Now, in severe cases of chronic indigestion it may be necessary to modify this diet in both directions, to give the meals more frequently, of course in smaller quantities, and to remove practically all farinaceous food from the diet for a time, using milk, eggs, cooked fruit, and meat and fish, with a very little toast or stale bread. But in the majority of instances abandonment of the richer and more complex articles of food is sufficient in itself.

Having thus regulated the diet, and taken the first step towards restoring the injured organs to their natural functions by giving them only the simplest work to do, one can proceed to attempt to give assistance by the use of drugs. And in chronic indigestion drugs are of the greatest possible value. Whether Dr. Eustace Smith's theory of the mucous origin of the symptoms be true or not, it is quite certain that the treatment founded on the theory is of great service. An alkali, with a few minims of tincture of nux vomica, given before meals, will serve to stimulate gastric digestion, and to give an appetite. Or, if it be preferred, a similar remedy can be given in the form of a powder, consisting of sodium bicarbonate and bismuth. Whether there is constipation or not, it is further advisable, at any rate in the initial stages of the treatment, to give aperient medicine, either in the form of rhubarb, or senna, or one of the aperient salts. In many cases instead of the alkali an acid mixture with a little arsenic or tinc. ferri perchloridi will be found to be as efficacious as the alkali, though the administration of iron should always be deferred until the bowels have been well opened and the tongue is clean. Another drug that is of well-proved value is mercury, used either in the form of grey powder or as calomel, and, personally, I believe that it is best to give the mercury in small repeated doses, and add to its effect by the use of salts. In those cases where the stools are large, whitish in color, and offensive, calomel, given three times a day, with a morning dose of magnesium and sodium sulphates, usually quickly restores the intestine to its normal functions.

When the child's bowels are acting naturally and its tongue is clean, when the restlessness and irritability are lessening and its appetite returning, iron and cod-liver oil, or one of its substitutes, should be employed. Alcohol is an unnecessary drug in these disorders. I have only indicated here the broad outlines of treatment, but, in the majority of cases, nothing further will be required. Special symptoms, such as repeated vomiting or marked pain after meals, during the progress of digestion must be met by special measures adapted to the circumstances, but, fortunately, children's recuperative power is so great that these complications are rare. The text-books on children's diseases recount much that is of interest regarding the rarer disorders of gastric and intestinal digestion, but these also may be passed over at present. Lastly, it will be found that if in a particular case progress appears slow or unsatisfactory a visit to the country or to the seaside will often make an enormous difference to the child's general condition, a difference which is usually permanent.

BRONCHITIS AND BRONCHO-PNEUMONIA IN CHILDREN.

By William A. Wood, M. D.,

OF GALLATIN, MO.

Among the diseases of children during the winter season none is more common or more fatal than bronchitis and pneumonia. If anything we can say on this subject shall lead to a more careful study of these grave diseases in young children, our labor will not be in vain.

In dealing with this class of patients very many difficulties confront the physician. The infant can give him no information, and the child who is old enough to answer his questions intelligently very often refuses to come to his aid, hence subjective symptoms are not available in reaching a diagnosis. The thermometer is an unreliable guide for the reason that in children the temperature fluctuates. It rises suddenly and falls just as suddenly without any ascertainable cause. The pulse is also unsafe as a guide in diseases, because the physician has no means of knowing what it is in normal health. Under the influence of nervous excitement, anger or fright both the temperature and the pulse are changeable and uncertain. When we add to these incidental influences the disturbing phenomena of disease, we begin to realize the embarrassments of the medical adviser.

The physician who is a close observer is, however, not without resources. He can get very much of the information he needs from the mother or nurse of the child and a patient study of the objective symptoms. There is a revelation in the cry of the child. The cry of pain is different from the cry of anger, or of hunger, or of exhaustion. He must note this difference. In pneumonia the cry is suppressed in consequence of its interference with respiration. The peculiarity of a cough must be studied. In ordinary bronchitis it does not cause pain. In pneumonia it is accompanied by more or less pain, which is plainly depicted on the face of the child. Physiognomy also teaches its lesson. Conditions of the countenance reveal the nature of disease. In sleep the face of a healthy child expresses repose. In pneumonia there is always a movement of the nostrils, indicative of difficult respiration. A chewing motion of the mouth denotes gastrointestinal disturbance. It is said that the upper third of the face is changed in brain affections, and the middle third in the diseases of the chest, and the lower third in abdominal lesions. Contractions of the brow show pain in the head, and drawing of the upper lip pain in the abdomen. A waxy color of the face indicates kidney disease, and a flush on the cheek, inflammation of the lungs or pleura.

As broncho-pneumonia is usually secondary to bronchitis, it is not an easy matter to determine exactly when it begins, for its symptoms are often very obscure, and for this reason it is important to study all the objective symptoms which may aid in reaching a correct diagnosis.

Bronchitis is a very common disease of infancy and childhood. It is variable in extent and intensity. It begins with a cough, hoarseness, difficulty of respiration and febrile excitement. There may be also soreness of the throat, coryza, sneezing, and a watery condition of the eyes. It may be ushered in with a chill or a chilliness, with languor, exhaustion and drowsiness, followed later by more or less fever. The pulse becomes frequent, with a rise in the temperature. The cough may be slight at first, but increasing in proportion to the extent and intensity of the inflammation. When it is frequent and severe it will be accompanied by more or less pain or soreness at the base of the sternum, but the face does not express the same degree of suffering as in the cough of pneumonia. The respiration in mild cases is but little accelerated, but in severe cases it is short, difficult and oppressed, and is attended by a wheezing or rattling sound, heard first in the throat, but subsequently over the whole of the chest.

The physical signs of acute bronchitis in very young subjects are a combination of mucous and sibilant rhonchi. In older children these sounds are more marked, especially the mucous rhonchi. When the inflammation extends to the more minute ramifications of the bronchi the general symptoms are correspondingly aggravated. We have now the capillary bronchitis the older writers, which is exceedingly dangerous, generally terminating in death, sometimes in a few hours.

Every case of bronchial catarrh should be regarded as the beginning of a pneumonia. In the commencement of an attack of bronchitis a small dose of calomel and Dover's powder, followed with castor oil or salines, will be of service. Quinine now in small doses should be given at short intervals for about two days. Alternate with this, the following:

℞

Vin ipecac	ʒj
Syrup scilla	ʒss
Syrup senega	ʒss
Tinct. hyoscyamus	ʒj
Cord. ol. morrhuæ comp. (Hagee)	℥ij

M. Sig.—Take from one-half to one teaspoonful, according to age.

The child should be kept warm with flannel next to the skin, should remain in bed with the room at a uniform temperature of not less than 65° F., and should be given mucilaginous drinks or barley water with such nourishment as will best meet the wants of the system. Fomentations or hot cloths applied to the chest will often be of service.

If there is much prostration the following prescription may be given:

℞

Spts. ammon. arom.	ʒj
Syrup senega	ʒj
Tinct. scilla	ʒss
Syr. prun. virg.	℥ij

M. Sig.—Take from one-half to a teaspoonful every two hours.

In children of eight years and upward, the muriate of ammonia in small doses may be substituted for the spts. ammonia aromatic.

In case the inflammation has extended to the lung substance and broncho-pneumonia is developed, the chest should be enveloped in a jacket poultice of linseed meal covered with oiled silk, and if there is a fever give the following:

℞

Potassii citratis	ʒj
Spts. ammonia arom.	gtt. xv
Spts. ether nit.	ʒss
Liq. ammon. acet.	ʒiij
Glycerine	℥ss

M. Sig.—Give one-half to one teaspoonful every two hours.

If the cough is distressing, give the following:

℞

Vini antimon	ʒss
Spts. ether nit.	ʒij
Tinct. opii camph.	ʒij
Cord. ol. morrhuæ comp. (Hagee)	℥iss

M. Sig.—From one-half to one teaspoonful every two hours.

Of course symptoms as they arise must be met. It may be necessary to resort to aconite or digitalis or alcoholic stimulants, but the above is the general outline of the treatment in these cases.

SOCIETY PROCEEDINGS

NEW YORK ACADEMY OF MEDICINE

SECTION ON PEDIATRICS.

Regular Monthly Meeting, Thursday, November 9, 1905.

The scientific business of the evening consisted of a symposium on Rheumatism in Children, the first paper of which was read by Dr. David Bovaird, Jr.

RECENT IDEAS ON THE PATHOLOGY AND ETIOLOGY OF RHEUMATISM.—Dr. Bovaird said that a practically universal impression has come to prevail among physicians in recent years that rheumatism is an infectious disease due to a micro-organism, the exact character of which is not yet definitely known, though perhaps some of the announcements that have been made with regard to the supposed discovery of the specific microbe may yet prove to be the real solution of the vexed problem. Rheumatism has all the earmarks of an infectious disease, the period of incubation during which there is discomfort and a tendency to begin with a chill, the fever and sweating and the more or less outspoken tendency to be self limited. It bears a close resemblance to a mild pyemic infection, due to some micro-organism in the blood. It occurs in seasonal waves, somewhat the same as has been noted for typhoid and scarlet fevers in England. There is complete dissatisfaction with the old theories that attributed rheumatism to some disturbance of the chemism of the body.

Certain announcements have been made with regard to the specific micro-organism of rheumatism, and the most attention has been attracted to a form of diplococcus, which has many resemblances to certain of the milder pyogenic microbes. It is thought to be due in some of its forms to a degenerate streptococcus. Micro-organisms following these descriptions have been found in the throats of sufferers from rheumatism and the occurrence of tonsillitis in connection with rheumatism, would seem to point out the tonsils as one of the modes of entrance for the microbe of rheumatism.

TYPES OF RHEUMATISM IN CHILDREN.—Dr. R. H. McConnell said that as the result of the study of cases of rheumatism seen at the Vanderbilt Clinic in recent years, certain types of the affection may be described. Altogether about 10,000 children are on the records of the Clinic, and nearly eight per cent. of these suffered from some type of rheumatism. This seems to be about the proportion of the occurrence of the disease. It was rather hard to find just what was the first manifestation of the disease, in many cases, but out of five hundred cases in which it was definitely ascertained, the following were the proportions of initial symptoms: Tonsillitis occurred in about 35 per cent. of all the rheumatic cases. This was not a mere sore throat but a severe affection of the tonsils. About 11 per cent. presented the symptoms of shortness of breath with some pain in the heart region, and suffered from endo-carditis, as the beginning of their rheumatic affection. Nearly 24 per cent. had as the first symptom a swelling and redness of one or more of the joints. Considering chorea as a rheumatic manifestation, a heart complication was found in about 70 per cent. of the cases. Erythema nodosum and rheumatic purpura were not seen. Pericarditis was seen in one-half per cent. of the cases, always with endocarditis. No cases of arthritis deformans were observed in children.

Diagnosis in Children.—Dr. Chas. G. Kerley said that the differential diagnosis of rheumatism in children presented certain difficulties of special kinds. The age of the child is of no little importance. Under fifteen months it is extremely rare and up to two years occurs but very seldom. It seems to be commonest between the fifth and tenth year. Certain parts of the history may help in the recognition of rheumatism. A family history of the disease, for instance, or a personal history of previous attacks, or frequent angina, or the occurrence of protracted vomiting, or former cardiac involvements, are helpful in the matter. The most frequent source of delusion in young children particularly is scurvy. Scurvy, however, is common in early life, while rheumatism is very rare. In uncomplicated scurvy there is no fever, whereas this is present always in rheumatism. The additional symptoms of purpura, hemorrhage from the rectum, spongy gums that bleed easily, in a bottle-fed baby, make the diagnosis absolute. It may be confirmed by feeding the child uncooked milk for a few days, when the immediate improvement will confirm the diagnosis.

Certain conditions simulate rheumatism and are often thought to be rheumatic, when they are of an entirely different nature. One of the commonest of these is muscle soreness, after fatigure, which so often comes in children, and is sometimes pronounced rheumatic, or the lameness and discomfort that follows an injury. It is always advisable to strip the child and look for evidences of this kind, whenever there is question of even slight forms of rheumatism. Flat foot is not infrequently mistaken for rheumatism, certain forms of bone and joint diseases and particularly those due to tuberculosis are sometimes diagnosed as rheumatic. It must not be forgotten that the first symptoms of Pott's disease is usually pain in the abdomen, which not infrequently is treated as rheumatism.

The differentiation, however, is not difficult. The stiff back, the care in rising, and in getting on and off chairs, and the vigilance to avoid any shock to the spine, can be readily seen if looked for.

Pain in the knee is often due to tuberculosis of the hip, and this can be recognized by the limitation of motion at the joint, and by the night-cry and other characteristic symptoms. The hip is seldom affected in true rheumatism. Tubercular ostitis of the knee may be deceitful at the beginning. Periostitis in its primary manifestations is often mistaken for rheumatism. The pain in this is often worse at night and a special point of tenderness will often be found over the bone if it is looked for. As the children grow older, the rheumatic affections come to resemble more those of adults.

Prophylaxis of Rheumatism.—Dr. Floyd M. Crandall said that for the proper prophylaxis of rheumatism in children a careful study of their history is necessary. Often a history of the whole childhood is needed. The child should not be treated simply from the first acute symptoms but their occurrence should be anticipated. Although rheumatism is an infectious disease, it is not the custom now to consider that the infection is the only important element in causation. The soil also plays an important role. Predisposition is of great importance. These considerations are especially true of rheumatism. Rheumatic children should be advised to wear flannel all the year round, light in summer, and heavier with the varying seasons, because this will diminish the danger of chills. Cold and wet feet must be particularly avoided. Care must be taken that the mother does not confine such children too much to the house, fearful lest they should catch cold, for they need air above all and sunlight to increase their resistive vitality. and must be made to get out of doors. Judicious exercise is necessary and yet too much exercise may do harm, and a golden mean should be sought.

Dr. Crandall does not believe that children of distinct rheumatic tendencies should be submitted to any so-called hardening process, by subjecting them to cold baths and permitting them to go round with bare legs even in damp weather. These indiscretions only increase the rheumatic tendency. A slightly cold bath may be given in the morning with quick friction after it, but this must not be enough to depress the child. Great care must be taken with the throat, since it is the ordinary portal of entry for the rheumatic micro organism. No illness of any kind must be neglected in a rheumatic child, since even mumps may prove serious. Endocarditis has been known to occur even after a simple torticollis. Except in the better class of patients there will as a rule be no question of removing the child to a different climate in the cold, damp weather, but in especially susceptible children a dry, equable climate is the only thing that will guarantee them against relapses.

The average child does very well at the seashore. This seems to be partly because of the enjoyment derived from opportunities for play, but not all of those with a rheumatic tendency stand the dampness well. They are apt to be better in the mountains. The question of climate, however, is very individual as regards the location. A damp, fresh water valley is not a good place for a rheumatic child, while a few miles away, near the top of a sunny hill may be an ideal place. Where there are many lakes and water courses as a rule the climate does not prove suitable, hence many of the places in the Adirondacks are out of the question.

For preventive purposes the only drugs needed are those which add to the child's health and strength. Iron and cod liver oil are advisable, just as for strumous children. Specific medication seems to have a definite place. Salicylate of soda may be given between attacks and manifestations, series of doses being given and then an intermission allowed before the drug is taken up again. It is especially of service where the patients have tendencies to the recurrence of growing pains or are the subject of frequent attacks of tonsillitis or of relapses of chorea. Children must be protected from exposure of all kinds and their nutrition must be improved.

Dietetic Treatment of Rheumatism in Children.—Dr. W. Gilman Thompson said that there is no preventive of recurrent attacks of rheumatism either in children or in adults, and in children as a rule the lack of success is more marked. There is no specific medication and even climate does not avail. In a warm climate there may be severe relapses and it does not affect only those of delicate constitutions, for it is well known that rheumatism does not spare the robust. Attacks of rheumatic fever are not due to meats or sweets or acids in the dietary as formerly thought. Rheumatic fever then must be treated first of all as a fever. Milk should be given in abundance with crackers and thin farinaceous drinks and not much saccharine material. Broths should be given, but made of vegetables rather than meats, and for ten days after an attack no red meats should be allowed. This limitation of the diet, however, should not be prolonged. Plenty of water should be ordered, and in order to make it tasty fruit syrups, without much sugar in them, should be employed as flavoring materials.

Medicinal Treatment.—Dr. William Shannon said that the digestive tract is always in an unhealthy condition at the beginning of rheumatism. It is important in rheumatism to obviate the cerebral effects. Salicylic acid will cut short the attack and hence there will be less liability of complication. It will not affect the diathesis, however. Often the difference between tolerance and intolerance in the use of salicylic preparations is due to the neglect of the precaution of using only natural products. The remedy is borne better if given on an empty stomach. In children under 10 years of age, 5 to 10 grains of it should be prescribed every third hour for three days, and then given at longer intervals. If powdered rhubarb, 2 or 3 grains, and bicarbonate of soda, 10 to 20 grains, be administered at the same time, the salicylate does its work better. Aspirin should be employed if salicylic acid is not tolerated. It is not so reliable, however, but may be given in the same dose. Salicin is inferior. In endocarditis sodium salicylate may be employed, but no drug protects the heart like rest. For the subsequent anemia iron and iodides may be employed and they will prove of assistance also in the absorption of pleural and peri-cardial effusion. For chorea, rest and constitutional treatment are needed. In purpura, iron and arsenic may be employed. Antiphlogistine, which of late years has become so popular, may be used to subdue the pain of certain joints.

OCCURRENCE OF RHEUMATISM IN CHILDREN.—Dr. L. Emmett Holt said that rheumatism is extremely infrequent in infants and often diagnosed when it is not really present, while the affection is missed in older children. He has never seen it in children under a year. When called to see a child supposedly suffering from rheumatism in the first twelve months of life it usually turns out to be scurvy or multiple arthritis due to the gonococcus, and the presumption is always against rheumatism in children under two years. Why this immunity exists is an interesting question. It is probably due to the fact that very young children are more protected and needless exposure has much to do with the recurrence of the disease. The diet of these children does not seem to be so effective since there is no specific diet, but it seems probable that the large amounts of water that children take with their food have much to do with the infrequence of rheumatic atacks. With regard to climate in rheumatic children emphasis must be laid on the exact locality. They are usually not improved in valleys nor in river nor lake regions. This is probably because of the humidity of the atmosphere in these localities. This accounts too for the greater frequency of rheumatism in England.

Dr. Holt has been surprised at the large doses of the salicylates which English physicians employ in obstinate cases of rheumatism. He has seen them administer 20 to 30 grains of salicylic salt every two hours, children taking as high as half an ounce in 24 hours. The drug is borne very well, though at times it produces a certain amount of dyspnea or air hunger which is the signal for lessening it for a time. The tolerance seems to be due to the fact that twice as much bicarbonate of soda as the amount of the drug given is always administered at the same time. Dr. Holt believes that the use of these larger doses should be tried in obstinate cases of rheumatism here in America.

Etiology of Rheumatism.—Dr. H. Koplik said that rheumatism is a polymorphic affection. The uric acid and lythic acid explanation have not been given up as yet. The individual differences in cases justify the thought of many different causes for the affection. Certainly purpura and erythema nodosum are very different from the classic joint symptoms of rheumatism. Treatment must be very varied for the different conditions and must be individualized. Very probably one of the reasons why infants do not develop rheumatism oftener is that the tonsils are not as yet well developed, adenoids are not yet present and the results of operations for adenoids have not left open paths for infections as they run around. The alkaline treatment seems to be good for prophylaxis. Undoubtedly the disease is often self-limited and in a number of cases salicylates have no effect on the length of the attack.

Specific Treatment.—Dr. J. E. Winters said that Dr. Fox, of London, expressed himself as follows: "I never see rheumatic fever any more because my house physician at once prescribes for rheumatic patients salicylic acid and the fever is over by the time of my visit." When there are failures with salicylic acid it is because there is inadequate preparation of the intestinal tract by calomel and rhubarb. Synthetic salicylic acid is not an anti-rheumatic remedy and is always a dangerous drug. Its sale should be forbidden and only the salicylic acid from nature's laboratory be employed. A distinguished clinician in New York said not long since that it is easy to cure ¾ of the cases of rheumatism but the remaining ¼ is hard. It is for this, the rheumatic relics of the solid tissues, that Dr. Winters has found acid fruits a sure specific. The anemia clears up and the patients convalesce very satisfactorily if care is taken to give them products of the soil direct from nature's laboratory.

Use of Drugs.—Dr. Coit, of Newark, said that personally for children he does not believe that initial fractional doses of calomel are as effective as one full dose. He gives 5 grains of calomel to a child of 12 years and has prompter action and better disinfection. He has found salicylate of quinine less likely to produce depression and uses it almost constantly.

Rheumatism is after all a mild form of pyemia and so he employs drop doses of iodine frequently repeated for its antiseptic effects. For children when milk is given in abundance it should always be diluted. Within a short time of the taking of milk fruits should not be eaten. It is a therapeutic sin to mix fruit and milk.

SALICYLIC DANGERS.—Dr. Ager, of Brooklyn, said the salicylates are coal tar products and soothe pain and lessen fever, but undoubtedly kill red blood cells, and if persisted in more than is absolutely necessary, add to the anemia so typical after rheumatism. Oil of wintergreen seems the best preparation to use in children because of its pleasant flavor, though lately Dr. Ager has found salicylate of quinine in small doses of good service.

Dr. Bell, of Englewood, N. J., said that he had suffered from rheumatism once under the old alkaline treatment when the fever lasted two weeks. In 1892 a second attack of rheumatism treated by salicylic acid, did not last near so long. He has never seen cyanosis when the natural salicylic salt is used and there is no heart depression or smoky urine. It seems almost criminal to employ the synthetic forms which may produce these effects.

SUPERSTITIONS IN RHEUMATISM.—Dr. James J. Walsh said that every theory in medicine and in everything else, when it disappears leaves its superstitions after it. Superstitions really mean a left over. At the present time physicians are agreed that rheumatism is a microbic disease, yet we hear of a family history, of a tendency, of a rheumatic diathesis, and of other left over ideas from the old theory that considered rheumatism a constitutional affection. It is true that persons may contract rheumatism a second time, or oftener, but so also they may contract pneumonia, yet there is no question of a pneumonic diathesis. Much has been said of specifics for rheumatism, all the infectious diseases have had their specifics in medicine, before their true character was recognized. Now the number of specifics is very few. The salicylates do good in rheumatism by lessening the pain and lowering the fever. The diminution of pain does away with restlessness and avoids heart complications. Any coal tar product will do the work under proper precautions. The question then of a specific remedy or a specific diet for acute rheumatism is a superstition the removal of which will lead to progress in medicine.

Dr. Chapin said that bruises are sometimes mistaken for rheumatic pains, and children should always be carefully examined. Weariness after hard play is sometimes thought to be rheumatism. The salicylates may cause purpura, sometimes set down as rheumatic in origin, and produce marked hydremia.

Dr. Hyman said that children are immune from rheumatism because their blood is in better condition than those of older people having high hemoglobins and more white and red cells. He considers the salicylates as almost a specific in rheumatism and suggests their use two or three days every month as a prophylactic in children with rheumatic tendency.

Dr. W. Gilman Thompson said that rheumatism occurs among the Esquimaux who live on an absolute meat diet and yet get over their rheumatism. It occurs in South Africa where the exclusive diet is plantains, and in Japan, where rice is used. There is therefore no specific diet for acute rheumatic infections.

EDITORIAL

SPIROCHAETA PALLIDA ONCE MORE.

Although conservative medical thought does not yet admit that in the *Spirochaeta pallida (Treponema pallida)* the specific organism of syphilis has actually been discovered, an active interest is nevertheless recognized as attaching to all studies of this organism, and a case recently reported at a meeting of the Societé Medicale des Hospitaux of Paris by Menetrier and Rubens-Duval seems especially significant, inasmuch as it shows an instance where the finding of the spirochaeta pallida in the blood provided an explanation for a death which otherwise would have seemed puzzling enough.

The case in question was that of a boy, born at term and showing no signs of congenital syphilis except a number of bullae on the sole of each foot, and in all other respects apparently quite normal. Macroscopic examination of the placenta also revealed nothing abnormal. Nevertheless the child died when but twelve hours old. An autopsy was obtained, and congestion of the organs was observed. This was particularly marked in the liver, which was very much enlarged and violaceous red in color.

The bullae from the soles of the feet were subjected to a microscopical examination and found to be due to a cleavage of the horny layer of the epidermis and to contain a large number of desquamated cells, among which were many *Spirochaetae pallidae.* These were also found less abundantly in the Malpighian layer of the skin and in the papillary layer and in the blood vessels of the epidermis. In the last mentioned situation some were discovered in the lumen of the vessels among the red corpuscles, others were in contact with the vascular endothelium, and still others were traversing the walls and passing out of the vessels. These findings afforded an explanation of the formation of the bullae, the spirilla evidently being brought to the skin by the blood stream, traversing the vessels and then the epidermis. In this situation, finding conditions favorable for their development, they proliferated rapidly. Examination of the viscera revealed the spirochaetae in greatest abundance in the suprarenal capsules, where they were most numerous in the vessels, the walls of which they were also traversing. Considerable congestion of the capsules was also noted, and similar conditions found in the liver and in the spleen.

It is evident, then, that while the only lesions produced were the bullae upon the soles of the feet, the infection had been generalized by the blood and an actual septicemia resulted. The placenta had been placed in hardening fluid immediately after delivery, and was also subjected to a microscopical examination. Only in the vessels were any spirochaetae detected, and even here not in such large numbers as in the tissues of the child. This difference, it has been suggested, might have been accounted for by the lapse of twelve hours between the birth and the death of the infant. It is also interesting to note that the chorionic villi in the placenta were the site of the organisms, which were thus found only in the fetal blood.

Altogether the case was one of great importance, demonstrating as the cause of death a heretofore unrecognized form of syphilis, namely a subacute infection of the blood similar to that of anthrax. Furthermore, everything that encourages and directs the general interest of the profession toward the study of this organism may bring one step nearer the solving of the great problem of venereal disease.

ARE WE A "VANISHING RACE?"

Much has been written and said of late, gravely, satirically and jocularly, concerning so-called "race suicide," and numerous individual cases of parents with remarkably well filled quivers—which prove nothing—are repeatedly set forth in the newspapers graphically depicted by means of "step-ladder" pictures in refutation of the idea that any such calamity is actually imminent. But at the bottom of all the careless and uninformed discussion there is a very real problem, and the concern so actively manifested in England is something more than a new feature for the "funny column."

It must be remembered, however, that other factors besides the diminishing birth rate are concerned in the gloomy outlook. which some have found in regard to this question. The vital statistics also show an astonishing disproportion in the mortality rate of infants and adults. Had the death rate for infants diminished at the same rate as that for older persons we might view with more equanimity the decline in the stork's activity. But when to the diminished birth rate is added the fact that in England, for instance, the mortality of the infantile population is practically stationary, one may be pardoned for asking in all seriousness the question: "Are we a vanishing race?" Apparently the babies have no share in the wonderfully rapid improvement in the handling of disease and accident which has reduced the adult death rate to such an admirable degree. France, Switzerland, Belgium, and Holland are no better off than England in this respect, and Germany, Austria, Italy, and Spain are said to be worse yet.

Naturally, in order to cope with any evil, it is necessary to discover the cause, and leaving those so-inclined to determine to their satisfaction the reason why no more babies are born, it might be well to consider what is the reason that, having been born, so many of them die in infancy. All things considered, after account has been taken of all possible factors, the evidence seems to show that the great majority of babies die from improper feeding. Some are undoubtedly born with a frail constitution, but even these might in many instances if properly nourished reach a reasonably efficient maturity, whereas the most vigorous constitution is not proof against the untoward effects of improper feeding. Just what constitutes improper feeding is not as clear as might be desired, but as to what constitutes proper feeding there is an undisputed unanimity of opinion, namely, that mother's milk is the best food for a baby, and that the extent to which artifiicial feeding of one sort or another is practiced is responsible, more or less directly, for the unduly conspicuous role which infants play in the mortality statistics. It would be desirable, of course, to remove the necessity for this mode of feeding, but in many cases one would have to begin, as Dr. Holmes advised, several generations back, in order to remove the physical defect which makes the mother unable to nurse her child, and as far as those who are unwilling to do so are concerned, it is doubtful if any, even the most convincing, arguments would have much effect. In individual cases something may sometimes be done to keep the mother in good physical condition; and any industrial reformation that removed the necessity of the mother's being a bread winner would incidentally work benefit in this direction. For the rest, something can undoubtedly be done toward reducing the risks of artificial feeding, especially among the poorer classes where ignorance so often lends as fatal aid to poverty as carelessness or malice itself could do.

ABSTRACTS

Treatment of Status Epilepticus.—MORTON AND HOSKINS (Boston Medical and Surgical Journal, June 15th, 1905, pp. 695-6). From experience gained in the Massachusetts Hospital for Epileptics the writers advocate subcutaneous injections of sodium bromide to ward off or cut short status epilepticus. To prevent irritation, not more than 30 grains of the salt should be used in each ounce of injection. In certain patients who are apt to have a series of convulsions, if two convulsions come in succession the head nurse gives ten hypodermic injections of twenty minims each (12 grains of salt in all). After each succeeding attack ten more of these injections are given till the patient has received forty of them. Should further treatment be required, a physician with an antitoxin syringe arrives, and the treatment progresses more rapidly. By this method the convulsions can be controlled in the majority of cases.

Value of Lumbar Puncture, with Particular Reference to the Diagnosis of Tuberculous Meningitis.—BERNSTEIN (Medical News, New York, June 17th, 1905). Normally cerebrospinal fluid is absolutely colorless, faintly alkaline, has a specific gravity ranging from 1,001 to 1,009, it contains .02 to .1 per cent. of albumin, and .04 per cent. of a glucose- like substance—pyrocatechin—capable of reducing Fehling's solution.

In purulent meningitis the fluid is yellowish in color and deposits a fibrin net after standing about 6 hours. In tuberculous meningitis the fluid is faintly opalescent, in brain injuries it may be bloody. It is unaltered in all non-inflammatory affections of the brain, cord, and meninges and in cerebral abcess. Albumin is increased slightly in tuberculous and considerably in purulent meningitis. Glucose is absent in purulent meningitis, absent or diminished in tuberculous meningitis,. As regards the cytology, in tuberculous meningitis the mononuclear cells predominate as a general rule. This is well shown in a table of 40 of the author's cases, only 3 of which were exceptions to this rule; in meningitis due to the meningococcus and streptococcus the polymorphonuclear cells are in excess, the same also obtains in 2 out of the 3 cases due to the pneumococcus cited by the author. In the bacteriological examination, the author recommends this method for obtaining films: cultures are first taken, the fibrin net, if present, is removed and spread on a sterile cover glass, the fluid is then poured into the centrifuge tube, and after ten minutes centrifugalization all but the last two or three drops is poured off, and the tube refilled to be centrifugalized again; this is repeated until all the fluid has been centrifugalized in the one tube, the sediment in which represents that of the whole fluid. A few drops of the sediment are spread over cover-glasses for cytological examination, the remainder is poured on the fibrin film and allowed to dry. The meningococcus of Weichselbaum was found in 64 per cent. of all cases of meningitis. In the author's 40 cases of tuberculous meningitis tubercle bacilli were found in 38, the highest percentage of positive results being obtained during the last stages. Meningococci, streptococci and pneumococci were found in all cases which subsequent cultures proved to be due to these organisms. Stress is laid on the fact that positive results only are of value.

Gastric Ulcer in Children.—Stowell (Medical Record, New York, July 8th, 1905). The rarity of this disease in children is noted, and a fatal case of perforating gastric ulcer in a child aged eight is described. The child had been delicate, but no symptoms referable to the stomach had appeared until three days before death, which took place two hours after perforation. Thirty recorded cases of gastric ulcer in children under fourteen have been collected by the writer, and a short résumé of each of these cases is given. Under etiology, the views of various writers as to hemorrhagic infiltration, embolism, and bacterial necrosis are mentioned. General diseases, especially tuberculosis, predispose to gastric ulcer. The symptoms are usually indefinite and irregular, the most common being indigestion, catarrh, constipation and anemia. The anemia is probably due to the disease. Hematemesis and melena may occur. Treatment must be on general and diatetic lines, combined with calcined magnesia, bismuth, and cerium oxalate. Silver nitrate in solution, or if possible, in a pill with opium may be given for its healing effect on the ulcer. The prognosis of gastric ulcer is good, and with treatment three-quarters of the cases recover. Hematemesis occurs at all ages, and may be fatal in infants, but in older children a fatal termination is usually due to perforation. As a summary of the subject a percentage table for gastric ulcer is given, but these percentages do not refer especially to children. Finally, a list of twenty-six references is appended.

General or Localized Hypotonia of the Muscles in Childhood.—Spiller (University of Pennsylvania Medical Bulletin, January, 1905). This is a remarkable condition, described first by Oppenheim in 1900. It is a congenital affection, and consists in hypotonia or atonia of the muscles so that the limbs are flaccid and motionless, and in severe cases there seems to be complete paralysis, but careful examination shows that weak voluntary contractions may be detected. In milder cases, while the hypotonia is marked, the weakness is noted only by lack of energy in the movements. The limbs, chiefly the lower, are generally affected; in one case the trunk and neck muscles also suffered. The electrical reactions appear to show a quantitative diminution. There are no other symptoms referable to the nervous system. The disease is quite distinct from the muscular dystrophies, which are never congenital, from the pseudo-paralysis dependent on rachitis or syphilis and from the amaurotic family idiocy of Sachs, in which the fundus changes are pathognomic.

Dr. Spiller relates a case of a baby, aged twenty-two months, in which an unusual condition was first noticed by the parents when the child was five months old. There was hypotonicity so that the front of the thigh could be placed in contact with the trunk and the foot could be placed behind the head without causing any discomfort to the child. The muscles were soft and flabby, but not wasted; the limbs moved voluntarily at all joints, merely weakness being present. The electrical reactions were normal. Dr. Spiller concludes that the disease is of the muscles, the nervous system being intact.

Congenital Hypertonia.—SPILLER (Univ. of Penn. Med. Bull., Jan. 1905). Diseases of different pathology have been grouped under the name of congenital spastic rigidity, or Little's disease. Little's cases were due to the influence of abnormal parturition. Spiller here considers cases of congenital spasticity without macroscopic lesions, but due to some arrest of development, not injury. He relates four cases. In the first there was found a diminution in the number of Betz's cells, in the ventral cornual cells, and a fineness of the nerve fibres forming the crossed pyramidal tract. In the second it appeared that the fibres of the pyramidal tract had not grown downwards in the cord in normal numbers as far as the lumbar region. The third case showed the same findings as the first; whilst the fourth case appeared to be a rare example of early spasticity of all four limbs caused by a lesion in the cervical region.

Cerebral Hereditary Syphilis.—BUTLER (Am. Med. Dec. 9, 1905). Butler says that the nervous system is attacked by hereditary syphilis in a considerable proportion of cases, sometimes without cutaneous lesions, the disease remaining latent until puberty or later. The pathological conditions include cranial osteosclerosis, periosteitis, meningitis, endarteritis, thrombosis, as well as atrophy, sclerosis and softening of the cerebral cortex. The symptoms are recurring convulsions, severe headaches, worse at night, and impaired intelligence. Later the epilepsy may disappear. Hemiplegia frequently develops and the patients may become paralytic idiots. Partial motor paralysis, aphasia and disturbances of the special senses may occur. Mental deficiency, occasionally congenital, usually develops at a later period of childhood. Prognosis is unfavorable unless the condition is recognized and treated in its earlier stages. Congenital syphilis should be vigorously treated with mercury during the prevalence of cutaneous manifestations and, when nervous symptoms develop, potassium iodid, or if this disagrees, iron iodid, should be added.

Pasteurization of Milk.—M. Perret (L'Obstétrique, May) describes experiments made by him with a view to ascertaining whether pasteurization is really of value in preparing milk for artificial feeding of infants. This method is not of easy application for mothers in their homes, because they have not the means of raising the temperature of the milk rapidly, nor of cooling it rapidly after heating. It has been shown by Marfan that if the milk is not cooled rapidly it becomes dangerous to the child. The author's experiments showed that the heat was not sufficient to destroy the bacteria in the milk, and that their activity continued when the milk was not rapidly chilled. At the same time the heat was sufficient to destroy all the milk ferments, and prevent their activity in the child's stomach. Since the year 1898, sterilized milk, heated for 45 minutes at 100° has been used in the Clinique de Nourrissons of Tarnier, and there has never been a death from gastroenteritis. In the Maternity, the same milk was used from 1892 to 1898 with the same results. Hence the author questions the utility of pasteurization, and believes it may be most harmful in practical use in the home.

Barlow's Disease.—Filippo Pagliari (Rivista di Clin. Ped., May) details a case of Barlow's disease observed by him, in a baby eight months of age, who was nursed for five weeks, and from that time was fed on sterilized milk. The condition of the child when seen at eight months was pitiable. It was unable to move its limbs, and showed great pain whenever it was touched or moved. Two upper incisors only were present, and the gums were swollen and hemorrhagic about them, as well as the lower gums, where the incisors had not yet appeared. There was progressive and persistent anemia, general depression, and grave cachexia. The neck and shoulders were covered with a copious pemphigoid eruption. The treatment by uncooked milk, with fruit juice, was rapidly effective, and the child entirely recovered. The author believes that in Barlow's disease we have, not a true infantile scurvy, but a new hemorrhagic disease distinct from all others, with the syndrome of scurvy from lactation. This may, with much probability, be considered an infectious disease. Its occurrence with sterilized milk feeding is only a coincidence, since it has been observed in breast-fed children also. Sterilized milk feeding is undoubtedly a contributing cause, because sterilization deprives the milk of its natural protective and inhibitory qualities and allows the cause of the disease to operate more easily. He believes that there are more cases of this disease than have apparently been observed, and that, with increased accuracy of diagnosis, many more cases will be reported.

Nephritis and Breast Feeding.—Luigi Concetti (Rivista di Clin. Pediatrica, Jan.) advocates allowing an infant whose mother has nephritis to continue its nursing under certain precautions. The mother must not be injured by the feeding and the child must be carefully observed as to its digestion and weight, and its urine must be frequently examined to guard against the appearance of a nephritis. We do not at present know what renal poison causes the symptoms of edema, etc., in nephritis, or whether such poisons enter the breast milk. At the same time, many cases of babies nursing mothers afflicted with nephritis have been observed, in which no bad effects on either the mother or the child could be perceived. We know that if toxins pass into the milk, there pass also antitoxins and immunizing bodies, and it is very possible that immunity may be thus produced in the child. The author cites an illustrative case of a mother who had suffered for some five weeks with acute nephritis, whose infant had suffered in no way. On removing the child from the breast and substituting artificial feeding, diarrhea supervened, and became so severe that in two weeks it proved necessary to return the child to the breast. It was soon entirely well, increased in weight, and at the same time the mother seemed to improve. Roger, in the Hospital for Infectious Diseases at Paris, allowed 100 infants to nurse while the mothers were infected with measles, scarlatina, diphtheria and erysipelas, taking all possible precautions to prevent direct contagion, and giving some cow's milk in addition when the mother's was diminished. In general, the children did well, and their mortality was much less than when placed on artificial feeding. The author considers it certain that the child nursing a nephritic mother stands a much better chance than if fed artificially, while, on the side of the mother, the health does not suffer from nursing.

Deaths in Anesthesia in Childhood.—J. Blumfeld (Clin. Jour., Feb. 1), after discussing cases of death during anesthesia, states his belief that the opinion is too widely held and acted upon that in the very young chloroform is the only suitable anesthetic; also that in cases of circumcision, when complete unconsciousness has been obtained, the anesthesia should be kept to a very light degree only. It is better that the nurse should have to control one thigh than that artificial respiration should become necessary.

Incontinuence of Feces in Children.—Two cases of this condition are recorded by M. Ostheimer (Univ. Penn. Med. Bull., Feb.). Both were in boys, who suffered also from enuresis. Recovery rapidly followed the use of good food, fresh air, and strychnine. Ergot is also employed in such cases.

Suprarenal Apoplexy.—R. E. Pick (Med. News, May 13) reports a case of sudden death of a newborn infant. The autopsy showed diffuse hemorrhagic infiltration of both suprarenals.

Epithelioma of the Face.—A case reported by M. J. Lippe (St. Louis Cour. Med., May) is of interest on account of the youth of the patient. The epithelioma was removed from the side of the nose of a child only four years old.

Congenital Tuberculosis.—This case is reported by Martha Wollstein (Arch. of Ped., May) on account of its rarity. The mother died of advanced tuberculosis six days after labor; no autopsy permitted, but uterus removed per vaginam. Cheesy areas with tubercle bacilli were found in the endometrium and muscular coats and in the placenta; no tuberculous lesions in the umbilical cord or its vessels. The child died after 19 days. Autopsy showed a few small tubercles without giant cells in lungs, liver and kidneys. Smears from the heart's blood and umbilical vein were negative for tubercle bacilli. The infection was, however, evidently hematogenous.

Diagnostic Value of Tuberculin in Orthopedic Surgery.—W. S. Baer and H. W. Kennard (Johns Hopkins Hosp. Bull., Jan.) report the results obtained in 40 cases of suspected tuberculous bone and joint disease, chiefly in children. These were positive in 25 cases, of which 6 were subsequently proved tuberculous by operation and 18 by history and response to treatment, while 1 is too recent to be of value. They conclude that tuberculin is the best and most reliable diagnostic agent for incipient tuberculosis of bones and joints, and its proper administration is attended by no permanent harmful results. The dosage is variable and it is rarely necessary to exceed 6 milligrams. The local signs are of equal, if not greater, importance than the general reaction, in bone and joint tuberculosis. Tuberculosis practically always reacts to tuberculin. While other diseases may possibly do so, the evidence is not conclusive. The diagnosis of tuberculosis can be made earlier and with more certainty by means of tuberculin than by radiography.

Infantile Paralysis of the Abdominal Muscles.—Judging from the number of reported cases, instances of residual paralysis of the abdominal muscles in acute anterior poliomyelitis are rare. W. B. CORNELL (Johns Hopkins Hosp. Bull., Jan.) reports such a case in a child of 21 months. The left arm, right leg, and right half of the abdomen were involved.

Mechanism of Detachments of the Epiphyses.—A. BROCA (La Presse Méd., March 4) tells us that there are two possible mechanisms of detachment of the epiphyses in children: either the epiphysis is detached by direct violence or it is torn off by ligamentous traction. Direct traumatism is everywhere possible, but is rare; indirect is usually responsible, on account of the anatomical relations of the parts. In some of the joints of which the wrist is typical, the ligaments are inserted on the epiphyses, therefore complete tearing off of these is possible. Clinical observation is in accord with anatomical considerations: separation of the epiphysis of the tibia is exceptional, while that of the femur is a relatively frequent occurrence, and is almost always produced by traction. Separation by direct violence is rare; that by muscular action is unknown. The head of the femur is an entirely intraligamentous articulation, and muscular traction is perfectly possible, but the author has never seen a case. Separation by traction from without is impossible. Clinically, separation is rare but very interesting. The occasion of the accident is very slight; the child does not fall, but feels a severe pain. It is able to walk, limping, and during the days following the femur becomes shortened. There has been a partial separation of the head, with gradual displacement. Hemorrhage into the joints is a consequence of these separations when intra-articular. When extra-articular, there is no hemorrhage, but there may be a fracture of the fragment of the epiphysis.

Movable or Wandering Testis.—EDRED CORNER (Clin. Jour., Feb. 22) reports three cases of this condition, in boys 6 1-3, 8 1-2, and 14 years of age. In the first the cremasteric reflex due to handling the scrotum would result in complete withdrawal of both testes into the abdomen. The writer says that the condition of movable or wandering testicle is associated frequently with imperfect development and descent of the gland, with a large tunica vaginalis frequently derived from the so-called infantile hydrocele, and an enlargement of the abdominal rings and inguinal canal, which if allowed to persist will lead to the development of a hernia with an acquired sac. In the majority of cases no treatment is required. If it persists over about the sixth or seventh year, or if a hernia develops, operation is indicated: orchidopexy, exploration of the inguinal canal for hernia, its treatment if found, and suture of the canal.

Vulvovaginitis Among Children.—In discussing a recent epidemic of gonorrheal vulvovaginitis in a hospital, A. C. COTTON (Arch. of Ped., Feb.) urges the establishment of detention wards in every hospital for children, in which the patients may be watched for at least 14 days before admission to the general wards, in order to determine freedom from acute infections, and isolation wards for removal of suspicious cases. Female infants are especially susceptible to gonorrhea. Children with this disease should be insolated in the care of a special nurse and with individual toilet articles, bedding, etc. The physician and nurse should exercise great care in sterilization before going from them to other patients as with other acute infectious diseases.

Rectal Gonorrhea in Vulvovaginitis of Infants.—KARL FLUGEL (Berl. Klin. Woch., March 20) describes the occurrence of rectal infection in 20 per cent. of cases of vulvovaginitis in little girls. There is in a few cases a true slimy discharge from the rectum, but usually it is observed only when a nasal speculum is introduced into the rectum, when little purulent lines of discharge are seen on the rectal wall. Some children complain of burning and desire to go to stool. Ulcers are rare. In some cases typical gonococci are not found in the discharge; in others they may continue to be found after 2 or more months of treatment. The causes are an extension of the process from the vagina, infection by syringes or thermometers, opening of gonorrheal abscesses into the rectum, unnatural connection. Suppositories of silver nitrate or ichthyol give the best results. Injections of silver nitrate may also be used. The rectum becomes free from gonococci sooner than the vagina and urethra. This is due to the fact that the germs do not penetrate so deeply as in the vaginal mucous membrane, and hence the medication more easily reaches them. The author recommends that one should look for rectal infection in every case of vulvovaginitis of gonorrheal origin.

Gonococci Infection of the Eye in Infants.—The prophylaxis of this affection, according to JOHN A. WEEKS (Arch. of Ped., May) consists in the use of antiseptic vaginal douches before and during labor, the objections to which from a standpoint of puerperal infection are now known, and local treatment of the infant's eyes. The lids should be washed immediately after birth, and a drop of 2 per cent. nitrate of silver or of 25 to 35 per cent. argyrol dropped on each cornea. The treatment of gonorrheal ophthalmia includes gentle irrigation of the conjunctival sacs with a 3 per cent. solution of boric acid every half hour, or less often, as is required to keep the eyes free from secretion. A 1 per cent. solution of silver nitrate should be applied thoroughly to the entire conjunctiva once daily, while the secretion continues. When this has virtually ceased, the solution is reduced to 0.5 per cent. and continued until the conjunctiva is nearly normal. Instead, protargol 10 to 15 per cent. may be dropped in every two hours until secretion has nearly ceased, when it is replaced by silver nitrate 0.5 per cent. once daily. Argyrol, 15 to 35 per cent., the stronger solution in severe cases, may be used by placing one or two drops in the conjunctival sac after its irrigation, every one or two hours, according to the severity of the case, less frequently as secretion diminishes. When it has ceased the boric acid solution alone is used until the conjunctiva is normal.

Anatomy of Congenital Hematoma of the Sternomastoid in the Newborn.—LUDWIG PINCUS (Zent. für Gyn., No. 20) says that in most cases of swelling of the sternomastoid in newborn children the origin is traumatic. The swelling may be, in a few cases, a typical hematoma, with a secondary myositis of a chronic type. In most cases the myositis is the most important symptom. There is a typical mechanism for the production of this lesion. The swelling occurs in spontaneous delivery as well as after surgical interference. There is a severe stretching of the muscle by separation of the two extremities in the rotation and descent of the child. An easy and rapid birth would predispose to this lesion, while a slower birth would not stretch the muscle as severely. It is more frequent with spontaneous births. Cases have been reported in which the lesion apparently did not occur during birth. One is reported in which the mother received a blow on the abdomen four weeks before labor. The child was born with swelling of the sternomastoid, and no pigment was found in the swelling to indicate the occurrence of a hematoma. Probably a blow was received by the child in intrautarine life at the time of the mother's injury. Some authors have thought that there might have been an infection of a normal or injured muscle by way of the blood current or the lymphatics from the intestine. Syphilis may act as a predisposing cause.

Infantile and Juvenile Tabes.—EDGAR HIRTZ AND HENRI LEMAIRE (La Presse Méd., May 20) tell us that juvenile tabes is a true tabes, and is now recognized as such. The most important diagnostic symptoms are pupillary abnormalities, changes in tendon reflexes and Romberg's symptom. Many of these symptoms may result from syphilis of the nervous system. Abolition of the reflex of the patella or Achilles tendon is the most important sign of lesions of the posterior columns of the cord. Romberg's sign does not appear in the early stages. The authors have collected in literature 46 cases of this disease, to which they add one case observed by them. None of them record autopsies, hence some may question the validity of the diagnosis. Occurring in young subjects fatal results of so chronic a condition have not been as yet recorded. The patients complain of visceral crises, of fulminating pains, troubles of sensibility, trophic and urinary disturbances as in older subjects, while incoordination is slight and not usually present early. The most constant early symptom in children is incontinence of urine, present in one-half of the cases. Amblyopia exists in 14 per cent. of cases, and is often the symptom for which the child is brought to the physician. Blindness sometimes results. The etiology of the trouble is usually hereditary syphilis.

Epidemic Cerebro-spinal Meningitis.—F. GOPPERT-KATTOWITZ (Berl. Klin. Woch., May 22) sums up the interesting diagnostic points gained from a series of 44 cases of epidemic cerebro-spinal meningitis, treated by him during the present epidemic. Of these 44 cases only twenty showed the typical stiffness of the neck. In twelve children under three years of age, and seven under one year, stiffness was the principal symptom aside from the fever and pulse changes. In five children under three years this stiffness of the neck was the only symptom observed. In cases without stiffness there were three types: in one intracranial pressure and bulging of the sutures and fontanelles was the principal symptom. To this category belong nine children between six and eleven months old. All the sutures may be separated and a new fontanelle may appear over the mastoid, due to the tremendous pressure. The prognosis in these cases is absolutely bad. In the second type, there are fever, rapid pulse and respiration, and signs of pain on passive motion, without any stiffness. The third type has a waxy color, high fever and a purulent bladder catarrh. In all cases there was a rhinitis, and in some cases a cough suggested lung troubles. There were severe inflammatory eye symptoms in several cases, and sensitiveness to motion of the extremities in most of them.

ARTHUR J. WOLFF (Amer. Med., May 13) calls attention to the variability in size and grouping of the diplococcus meningitides in different media, etc., extending from a very minute monococcus to large forms in tetrad or diplococcus grouping. The fact which suggested the possibility of obtaining therapeutic effects from injections of diphtheria antitoxin was that when a 24-hour bouillon culture of the meningococcus is mixed with 3 c.c. of diphtheria antitoxin of 1,000 units strength, a precipitate forms in 24 hours, and in 48 the liquid above is perfectly clear and devoid of organisms, while smears of the cocci in the precipitate stain with great difficulty.

G. L. PEABODY (Med. Rec., May 13) has tried the administration of diphtheria antitoxin in 22 cases of cerebro-spinal meningitis, in all but one of which the diagnosis was confirmed by finding the diplococcus in the spinal fluid. One case received the first injection on the first day of the disease; five on the second day; six on the third day; four on the fourth day; and others on the fifth, sixth, and later days. In all cases fluid was removed by tapping, usually between two drams and one ounce. Of the twenty-two cases four received the antitoxin only subcutaneously, seven received it at different times both subcutaneously and intraspinously, and eleven received it only intraspinously. In only one case did it seem to cause any unpleasant effect, an urticaria which lasted several days after a single intraspinous injection of 2,000 units. She recovered completely from the disease. The doses varied from twelve hundred units to fifteen thousand. Only two patients received but a single dose each. In all of the others it was repeated at least once, and some received four, five, and six doses. The treatment was begun three months before the writer's report. Of the twenty-two, eleven had died, making a mortality to date of fifty per cent. Seven of these eleven died before the sixth day of the disease. Of the eleven dead one received the antitoxin on the first day of the disease; three on the second day; two on the third day; three on the fourth day, and only two later than the fourth day. Of the eleven still living, two were entirely well; two others were fully convalescent; five were still under treatment (no longer by antitoxin), with active symptoms and very grave prognosis; and two were practically moribund. The writer has observed no influence, good or evil, ascribable to the use of diphtheria antitoxin.

Tuberculous Meningitis.—The tabulation of 43 fatal cases of this affection occurring at the Children's Hospital, Carlton, by W. H. SUMMONS (Intercol. Med. Jour. Austral., May 20) shows: (1) That tuberculous meningitis is a secondary condition. Of the 35 cases in which an autopsy was held, all had a more or less general tuberculosis. This shows the uselessness of trephining in their treatment. (2) The commonest seat of primary infection was the bronchial glands, usually of the right side. The percentage, where bronchial glands were the probable primary seat, was 66. As the bronchial glands drain a considerable lymphatic area, they themselves may be secondarily infected from some distal mucous membrane. (3) The mesenteric glands seemed to be the primary seat in 17 per cent. of cases. In these the bronchial glands were normal. In no case of this class was there a tuberculous ulcer of the intestine. (4) Double optic neuritis occurred in 45 per cent. of the cases, but choroidal tubercles were present in only one case out of these 29.

S. W. CURL (Lancet, May 6) has examined the blood of the ten cases of meningitis in children, eight of which were proved by autopsy to be tuberculous, while one had intestinal and peritoneal tuberculosis and the tenth had symptoms of the disease. He finds that the red corpuscles are usually present in normal or increased numbers; the majority of cases show no leucocytosis; the eosinophile cells are reduced in number, and the large lymphocytes and transitional cells are generally present in increased proportions.

Treatment of Mumps.—G. CARRIERE (Le Nord Méd., June 1) says that mumps is an infectious disease, epidemic and contagious, and that it should be treated accordingly, instead of being ignored as is done at present. The infection enters by the mouth or nasopharnyx, invades the parotid gland by way of Steno's duct, and then enters the circulation. The contagion begins at once, and the child should be at once isolated. In schools the child should be at once excluded. At the end of two weeks the contagion is no longer to be feared. Isolation should be complete. Everything used by the patient should be carefully disinfected, the room also after the patient has recovered. The patient should be in bed, and should not go out until eight or ten days after the end of the fever. Nephritis has been discovered after mumps. The nasal cavity, mouth and pharynx should be disinfected daily, and the parotid should be treated by internal medication with quinine and salicylate of soda, as well as by medicines that are eliminated by the saliva, such as mercury, iodides and bromides. The complications are otalgia, orchitis, and oophoritis, and all should receive appropriate treatment. The last two require rest in bed and tepid baths and applications.

Arthritis After Measles.—W. E. DARNALL AND M. TOWNSEND (Arch. of Ped., May) found swelling and tenderness of both ankle and knee joints about 8 days after disappearence of the rash of measles in an infant of 8 months, temperature 99-100° F. This condition persisted in the right knee joint and 11 days later temperature rose to 102°. Five days after this the joint became red. There had been no symptoms of sepsis, but aspiration showed pus, so the joint was incised and drained, much pus being evacuated. There was apparently no bone disease. Death from exhaustion occurred within a week; no autopsy.

Sudden Obstruction in Intubation without Surveillance.—E. ESCAT (La Presse Médicale, June 7) tells us that the two accidents after intubation that require a trained attendant are the expulsion of the tube and its sudden obstruction by membrane. The first accident is not a real danger, for the lumen of the larynx has been sufficiently stretched by the tube for breathing to continue long enough to send for a physician to replace it. The real danger is the obstruction of the lumen of the tube by membrane which has formed below it. If the obstruction be gradual it does not constitute a serious danger. The best method of preventing obstruction is to use a tube of as large caliber as the larynx can retain. When a small tube has been used the thread may be left in place in order to make traction on the tube in case of necessity. A steam of carbolic acid or thymol should be maintained in the room, to prevent drying of the air. Coughing should be provoked after introducing the tube, so as to cause the ejection of all membrane that remains in the trachea. The tube may be withdrawn by an attendant. It may be lubricated daily with a syringe with menthol oil, or a resorcin glycerin solution. The administration of sedatives should be discontinued. The author has also introduced a set of tubes, made with oval openings in the sides, so that even if the lumen be obstructed, air may enter through them. He believes that it is much better to trust to intubation, even when there may be obstruction of the tube, which occurs once in 700 cases, than to do tracheotomy, of which the mortality is 10 per cent.

Vesical and Urethral Calculi in Children.—Franco Crosti (Gaz. Med. Lombardi, May 29) describes vesical calculi in infants and children as of quite frequent occurrence, especially in males. After puberty the number of cases diminishes rapidly. It is more common among the poorer classes than among the more well-to-do, and this is probably due to the preponderance of vegetable foods, since the majority of the calculi are of oxalate of calcium. Primary calculi are formed in the kidney, descend to the bladder and increase in size there. Secondary calculi are due to local causes in the bladder, cystitis and retention. The causes aside from the generally recognized ones of heredity, feeding, etc., are small size of the urethra, the coexistence of phimosis, and the frequency of infarcts of uric acid in the young. Small urethra favors the precipitation of salts in the urine, as does phimosis. There are rarely two or three calculi present in the same bladder. They generally occupy the fundus and are free. The principal symptoms are slight hematuria, disturbances of urination, generally retention, and sudden cessation of the flow, or incontinence, rebellious to ordinary treatment, and pain that is often very severe, causing the child to handle the parts for relief. Pruritus at the meatus is another symptom. This form of cystitis resembles tuberculosis of the bladder, having the same symptoms. Bacteriological examination is necessary to make the diagnosis between them. The bladder should be explored under anesthesia, and the calculus will be discovered by the sound.

Typhoidal Insanity in Childhood.—Edsall (Amer. Jour. Med. Sci., 1905, p. 327). Dr. Edsall states that the prognosis to be given in a case of typhoidal insanity depends upon whether one accepts the view of medical clinicians, or that of alienists. Only few of the former admit that mental derangement is likely to persist in as many as 20 per cent. of the cases, whilst the alienists state that in most instances a noteworthy percentage of cases remain insane. This diversity of opinion is found in regard to typhoidal insanity in children as well as in adults. From reference to over 80 cases in the literature, Dr. Edsall concludes that though uncommon, the condition is not rare in childhood, and he further found that mania is slightly more common than dementia, whilst melancholia is much less common. Dementias, when of marked degree, are of far graver prognosis than the other forms of insanity. In most of the manias there is a very pronounced element of melancholia. In addition a confusional state is so common that the lines distinguishing the three forms are often extremely difficult to draw.

PEDIATRICS

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ORIGINAL ARTICLES

ON SOME COMMON SYMPTOMS OF DISEASE IN CHILDREN.*

By Robert Hutchison, M.D., F. R. C. P.,

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On one or two previous occasions, when it has been my turn to lecture here, I have taken up some aspects of disease in children from what one may describe as the symptomatic standpoint; that is to say, I have selected certain common symptoms, and then tried to make out what their diagnostic significance was. I believe that to be an exceedingly important way of treating a subject. It is essential for you to have your medical knowledge "indexed both ways"; in other words, you should be able at examinations, given a certain disease, to tell what are its symptoms, and you should also be able at the bedside, given certain symptoms, to say what is the disease. The training which fits you to reply to one set of questions does not always enable you to reply to the other. I make no apology, therefore, for taking up some more symptoms in the same manner and trying to arrive at an idea of their diagnostic value, and shall deal today with some symptoms relating to the alimentary system.

ABDOMINAL PAIN.

Abdominal pain is a very common symptom in children, and its cause is often difficult to determine, because if there be, as there often are, no objective signs of disease, you have very little to go upon in forming your diagnosis. A child is unable to tell you exactly where the pain is, when it comes on, what is its character, and so forth; and hence you find lacking in children those guides to diagnosis which are often present in the case of abdominal pain in grown-up persons. There is all the more reason, therefore, why you should study carefully what the possible causes of abdominal pain are, so that you may proceed to your diagnosis by the method of exclusion.

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*A lecture delivered at the Hospital for Sick Children, Great Ormond Street, W. C.

The first thing I would remark about abdominal pain in childhood is that it may be due to causes which are outside the abdomen altogether. I would therefore group the first set of causes as *extra-abdominal*—that is to say, cases in which pain is referred to the abdomen, although its site of production does not really lie in the abdominal cavity at all. One fairly common example of such an extra-abdominal cause of pain is *spinal caries.* The pain of spinal caries, traveling along the intercostal nerves, is very often referred by the child to the epigastrium, and the first piece of advice I would give you is, that when pain is complained of in the epigastrium, you should never omit carefully to examine the vertebral column for signs of disease. Another extra-abdominal cause of pain is *pleurisy.* Dry pleurisy is not common in children, but when it does occur the child often refers the pain to the pit of the stomach. It may therefore be necessary, in order to exclude this cause, to examine the basis of the lungs carefully for friction sounds, because it is only when the pleurisy is of the dry variety that sufficient pain is produced to give rise to symptoms. Another possible cause of pain referred to the abdomen, but really due to causes outside it, is *hip disease.* In a few cases the pain of hip disease is referred by the child to the iliac fossa, and you are apt to be misled, and to think you are dealing with appendix mischief or something of that sort, when all the time the seat of the trouble is in the hip. All these causes you may have to satisfy yourself as to the absence of, before you conclude that the pain is truly intra-abdominal in character. Before leaving this part of the subject I should mention that abdominal pain seems sometimes to be of *rheumatic* origin, although it is uncertain whether its seat in such a case be really intra-abdominal or merely in the abdominal wall. The pain comes on paroxysmally, starting usually below the costal margin on either side and lasting for a few minutes. There may be several such attacks in the course of the day, and after lasting for a few days they may culminate in acute rheumatism.

Passing now to the causes of abdominal pain which are due to disease inside the abdominal cavity, I would point out that pain of intestinal origin is certainly commoner in children than pain of gastric origin. In other words, any pain in the abdomen is more likely in a child to be due to something wrong with the intestine than to some disorder of the stomach. The reason is that children do not often suffer much from organic disease of the stomach. Functional dyspepsia, I need hardly say, they do suffer from to a great extent; but such organic diseases as ulcer or carcinoma of the stomach children do not exhibit, except in rare cases. Now, you know that functional dyspepsia does not give rise to severe pain; it causes discomfort, distension, sensations of sinking, and so on, but not real pain. With regard to intestinal pain, I should say that the most common cause of it is colic, in one or other form. Such intestinal pain is often very deceptive, for the reason that it may come on immediately after the taking of food. You will constantly see children—they are usually about five to ten years of age—who are brought with the complaint that there is pain in the abdomen which comes on immediately after eating and you will naturally think that the pain must be due to some condition in the stomach itself. But you must not allow yourselves to be deceived in that way, because it would seem that the entrance of food into the stomach often excites peristaltic contractions in the intestine, particularly perhaps in the colon, which contractions give rise in certain patients to a pain which is colicky in character. The most conspicuous example of such excitation of peristalsis in the large bowel is found in the case of lienteric diarrhea. In that condition, as soon as the child takes food there is an immediate tendency for an action of the bowels to occur. The food has excited a peristaltic contraction in the colon, and that leads to defecation. Similarly, in certain cases, the entrance of food into the stomach gives rise to contractions in the bowel, such as produce colicky pain. Sometimes a very small amount of food will cause it. I have even known cases in which the taking of a little milk gave rise to severe distress. The pain may be so severe, for instance, that the child has to rise from the table and lean against some hard object, such as the back of a chair, in order to get relief. Further, you will find that in many cases the kind of food that the child eats does influence the pain, that it is worse after eating hard and comparatively indigestible foods. I suppose that is because such bodies stimulate the interior of the stomach more powerfully than the blander forms of nourishment do and so give rise to more powerful reflex impulses. At any rate, all these things taken together—the fact that the pain comes on immediately after eating, and that it is influenced by the nature of the food—are apt to lead you into error, and make you think it cannot be pain of intestinal origin, but that it must be due to some disorder of the stomach. But I advise you not to be so deceived, and to remember the possibility that you are dealing with a purely intestinal pain. Another point about these intestinal colicky pains in children is that they frequently come on when the child walks quickly. Perhaps the commonest circumstance in which they come on is on hurrying off to school after breakfast; such a pain is usually referred to the right iliac fossa and may be so severe as to necessitate sitting down. I do not pretend to be able to explain why it is that exertion brings on pain of that sort, but I think most people suffer occasionally in that way, and must have experienced the fact that violent exertion, or even hurrying after a meal is apt to produce what is popularly called "a stitch in the side," usually on the right side, in the region of the cæcum.

Slight *chronic appendicitis* may be a cause of abdominal pain The position of the pain will draw your attention to its possible cause. Appendicitis in childhood is by no means a common event. It does occur undoubtedly, but it is relatively not so common as it is in later periods of life, and the younger the child is the less likely is it that you are dealing with any form of appendicitis, and the more likely is it to be colic. In trying to confirm or exclude this cause you will have to palpate the appendix region with special care, and note whether there is a point of special tenderness between the umbilicus and the anterior superior spine on the right side—that is to say, over the site of the appendix. If you find there is a tender spot there, and particularly if the child has recurrent febrile attacks, your suspicion that it is appendicitis will have been confirmed.

Another cause of occasional pain in the intestines undoubtedly is the presence of *worms,* particularly, I think, of round worms. Now it would be a mistake to suppose that to be a common cause; still, one does every now and then meet with cases in which a child has suffered from intestinal pain, often referred to the region of the umbilicus, in which relief has only been experienced after the passage of a round worm, either by the bowel or by vomiting. And I think one is bound to conclude that such a cause may account for the pain, and that worms have sometimes acted in the way in which a lump of indigestible food would act.

Passing from these intestinal causes, one has to mention another possible source of abdominal pain which you are apt to overlook, namely pain which is produced in the *urinary tract.* By that I mean the pain which arises on the passage of uric acid or small stones down the ureters. The pain due to this cause may closely simulate intestinal colic. It comes on irregularly; it is referred usually, if the child be able to refer it to any spot, to the lateral region of the abdomen, and it often passes down into the groin. But in some cases all these aids may be absent, and it will be necessary for you to make a careful examination of the urine for the presence of uric or oxalic acid crystals, before you can exclude this cause of obstinate abdominal pain.

There remains, lastly, for consideration the pain that is of *gastric origin.* I will put a query against that on the board, because I am not certain whether pain of gastric origin occurs at all in childhood. Still, one does meet with cases where the results of treatment seem to show that the pain has been in this nature, cases in which the child has complained of pain, as a grown-up person does, a short time after food, perhaps one to two hours afterwards, and where the pain has been relieved by giving drugs which are directed to exert either a soothing effect upon the stomach or to neutralise hyperacidity. I had such a case not long ago in the person of a little girl who complained of pain in the stomach shortly after meals. Examination revealed nothing definite, but I treated her with carbonate of magnesia, and the pain at once disappeared. I think there is reason to suppose that such pain is due to the over-production of acid, just as may happen in an adult. But I believe such cases are uncommon in children, and in the majority of cases you will be wise to suspect that pain arising soon after meals is not of gastric but of intestinal origin, and inasmuch as colicky pains are more common, it is of their treatment that I wish more particularly to speak to-day.

The first thing to be done in dealing with intestinal colic is to see that the diet is adjusted in such a way as not to produce much fermentation in the intestine, and you should therefore see that the food does not contain those ingredients which tend to produce large quantities of gas—I mean such articles of food as are rich in cellulose, which is the source of marsh gas in the intestine. You will therefore eliminate green vegetables, restrict or abolish the consumption of fruits, and limit all the starchy things in general, whilst you may have to increase the amount of animal food in the diet so as to compensate for the restrictions in other directions, and insure that the child is sufficiently nourished. So much for the dietetic treatment.

Now, there is no doubt that some of those cases are aggravated, if not actually caused by chilling of the abdomen. It is always wise, therefore, to order that the child should wear a warm flannel abdominal binder. Lastly, you will have to consider the question of drugs. Many—perhaps, indeed, the majority—of these patients suffer from constipation. Even when there is no apparent constipation it is advisable to begin the treatment by administering laxatives, and it is well to combine with these such drugs as belladonna or hyoscyamus which have the power of diminishing intestinal spasm. I have found a combination of cascara and belladonna in the following form very useful: fluid extract of cascara 5 to 10m (the dose being graduated according to the condition of the bowel), tincture of belladonna 5m, aromatic spirits of ammonia 15m, syrup of ginger half a drachm, and peppermint-water to a couple of drachms. The child takes this dose three or four times a day, after meals. You will find that the effect of a medicine of that sort is to cause a gentle laxative action, and in addition belladonna tends to prevent any griping, and with some such treatment as that you will, in the majority of your cases, meet with success. Sometimes, however, you will find that the pains persist in spite of all you can do, and if you are face to face with a case of that sort you may be compelled to fall back upon opium. Two grains of Dover's powder night and morning, or two grains three times a day if necessary, will be found sufficient in most cases to allay the pain. The disadvantage of opium is its constipating tendency, and the fact that it has often a depressing effect upon the digestion. But it is curious that where opium is needed, and where it is doing good, the constipating tendency is often in abeyance. The opium seems to act in such cases simply by relieving the irregular peristalsis and spasm of the bowel, and not by causing a cessation of the peristalsis altogether.

DYSPHAGIA.

I want now to pass on to speak briefly of another symptom, one which is far less common, though of considerable interest, and which will sometimes puzzle you and occasion you a good deal of trouble in practice; that is, dysphagia in children. Difficulty in swallowing is a subject which you do not read much about in books which deal with diseases of children, but you will find that it is not a very uncommon occurrence in little babies and in children up to, though not often beyond, the age of three. By dysphagia I mean a difficulty in carrying out the act of swallowing. The mother will tell you that the child takes a mouthful of milk, and when it gets to the back of the throat it seems to lodge there, the child makes an abortive attempt at deglutition, but the milk comes back again out of the mouth, very little going down the throat. Your advice is sought as to the cause of this, and how it is to be put right. The first thing to do in a case of this sort is to make sure that there is no mechanical obstruction in the throat. The most common mechanical obstacles are *congenital adenoids*—which I have repeatedly known to cause difficulty in swallowing—and *cleft palate*. I saw, not long ago, a baby in whom this symptom was very well marked. For a time it puzzled me. I examined the throat by rather an indifferent light and I thought I saw nothing wrong, and I could not understand what the difficulty in swallowing was due to. But next time the child was brought to me I had a better light and saw that there was a bifid uvula. I have no doubt that was a sufficient cause for the difficulty in swallowing in this case. You will frequently find difficulty in swallowing in children who suffer from *mental deficiency*. The act of swallowing, like most other co-ordinated muscular acts, is acquired with difficulty by these children, and if you can see no local cause for the dysphagia you should bear in mind the possibility that you are dealing with a child who is mentally defective. In older children you may find difficulty in swallowing result from *paralysis of the palate*, which may be one of the sequelæ of diphtheria. It may also be seen in children in whom the throat is very irritable and congested, and where there is some enlargement of the tonsils. You may find in such a case that as soon as a crumb or anything solid gets into the child's throat it excites hawking and retching movements and the child cannot swallow it. Some of these cases are exceedingly troublesome, and I remember one in which the use of purely liquid food had to be persisted in so long that the child became rickety. In some cases difficulty in swallowing is due, I believe, to what one must describe as *perverseness* on the part of the child, or pure "cussedness." Many children who are accustomed to the bottle, especially if they have been allowed to have it too long, very much resent the transition to solid food, and they show their resentment by hawking and coughing, and spitting out any solid food which is given to them. I had a case in private the other day where the mother was very much alarmed at this difficulty. The only plan in such circumstances is firmness, to insist again and again, no matter how often the food is rejected, on the child taking it. Sometimes you can overcome the difficulty by gradually increasing the consistence of the food; you can begin by thickening milk with farinaceous material and get it gradually thicker, until it is practically solid. At any rate, I am sure that perseverance in such cases can always overcome the trouble.

VOMITING.

It will be convenient to consider this symptom (1) as it occurs in young babies, and (2) in older children. The commonest cause of vomiting in young babies is some error in feeding, a maladjustment of the food to the digestive power, the giving of too strong a milk mixture being the commonest. On the other hand, the mixture may be right in its proportions, but the vomiting is due to its fermenting in the stomach and producing acidity. The commonest cause of this is the use of a tube bottle. It is always well to bear in mind, however, that vomiting may be the sign of more serious disease, and one thing which you have to exclude early if you can is *congenital stenosis of the pylorus*. Congenital stenosis of the pylorus is a rare condition, but still it is probably commoner than is generally believed. It is doubtless often overlooked. It consists, as you know, of an overgrowth of the muscular and fibrous structure of the pylorus, leading to difficulty in passing on the stomach contents. Whether this malformation be the result of prolonged spasm is not known, but in a typical case the usual history is that there was little or no vomiting until the child was two weeks old, when vomiting began and has persisted ever since. You will find that all sorts of foods have been tried, that each food suited for a day or so, and that then the vomiting began afresh. You will find, further, that the vomiting is usually associated with constipation, and that, of course, there has been progressive loss of weight. When you examine the child there is usually no sign of organic disease other than distension of the abdomen, but if you are lucky you will be able to see what is the diagnostic sign, namely a wave of stomach peristalsis, which begins below the left costal margin, and travels towards the umbilicus. The peristaltic wave often occurs in two portions separated by a sulcus, so that the stomach stands out like an hour-glass. Sometimes, too, you can feel the thickened pylorus by pinching up the abdominal contents a little above and to the right of the umbilicus.

Intussusception is another possible cause of vomiting in infants and should always be thought of when the vomiting has come on suddenly.

Lastly, vomiting in young babies may be *symptomatic.* Some cases of meningitis, for instance, begin with vomiting, and so may the acute specific fevers.

(2) Passing now to the question of vomiting as it occurs in older children, here again the symptomatic causes are not to be lost sight of. The older the child the more likely is vomiting to be of symptomatic causation. It occurs especially in febrile disorders, such as pneumonia and scarlet fever; or it may occur at the onset of tuberculous meningitis or in cases of cerebral tumor or uremia, and it may be necessary to look for the other signs of those conditions. Vomiting in older children may also be the result of *acute gastritis*, the so-called accidental dyspepsia. If the vomiting be periodic, you have to think of the possibility of *migraine,* which is not uncommon in children. A child will be brought to you who has "bilious attacks," as the mother says, and you will only find that such a child is really the subject of migraine. Sometimes you have to deal, not with the typical form of the disease, but with "masked migraine," in which headache is not a prominent symptom, but where the chief symptom is vomiting. These cases are to be dealt with by removing all possible causes of cerebral strain, particularly correcting errors of refraction in the eyes, and by the habitual administration of aperients. Recurring gastritis may simulate migraine. In children

who suffer from slight chronic gastritis one finds that every now and then, after a little chill or indiscretion of diet, the condition flares up into an acute or subacute attack. You will recognize such cases by the fact that they are nearly always febrile, the child has fever and a furred tongue, and these are generally absent in true migraine.

Lastly, there is the recurring periodic form of vomiting in nervous children which is termed *cyclical vomiting*, which can be recognized by its periodicity. It occurs at very regular intervals, is very little influenced by the kind of food the child takes, and will often go on even when the stomach is empty. Cases of this sort are not very common, but one meets with them every now and then, and they have to be treated by attention to the nervous system, the continued administration of bromides and aperients being perhaps the best method of dealing with them.

A CASE OF DIPHTHERITIC HEMIPLEGIA

WITH COMMENTARY.*

By J. D. Rolleston, M. A., M. D., Oxon.

A boy, aet. 6, was admitted to hospital on Nov. 21st., 1904, for diphtheria. He had been ill six days. The extensive faucial edema and exudation, cervical adenopathy, rhinorrhea, and oral fetor testified to the severity of the attack. There was a cloud of albumin in the urine, which persisted till the forty-first day of the disease. On admission and on the two following days he receiving three doses of antitoxin of 24,000 units each. The throat was syringed four-hourly with a lotion containing potassium chlorate and myrrh, and he was given 5 minims of adrenalin solution (Parke Davis) in a drachm of aqua camphoræ two-hourly. On the 25th the voice was first found to be slightly nasal. The membrane had all gone from the fauces by the 26th, leaving extensive superficial necrosis of the mucosa of the tonsils, uvula, and soft palate.

The same day, on examination of the heart, which had hitherto been normal, the sounds were found to be very rapid and close together. The liver, which had been examined daily and hitherto showed no signs of enlargement, could now be felt one finger's breadth below the ribs. The voice was decidedly more nasal.

On Nov. 27th, the pulses were weak and unequal. The apex beat of the heart was close to the nipple line, and there was a triple rhythm. The liver was now one and a half fingers' breadth below the ribs. On Nov. 28th, general urticaria developed, fresh crops appearing during the next two days. The liver was two fingers' breadth below the ribs. The heart and pulses were as before.

On Nov. 29th, the fourteenth day of the disease, the patient vomited for the first time. The heart action was rapid. Triple rhythm with occasional irregularity was present. The apex beat was still in the nipple line. The liver was now three fingers' breadth below the ribs. Mouth feeds and medicine were stopped, and nutrients containing 4 ounces of peptonized milk and 15 minims of adrenalin solution were administered every four hours. The vomiting persisted, the pulse became weaker, the heart action more irregular, and the total amount of urine in the twenty-four hours fell to 3½ ounces.

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*The Medical Press.

On Dec. 3, the eighteenth day of the disease, 20 minims of tincture of belladonna and 20 grains of potassium bromide were substituted in alternate feeds for the adrenalin solution, which was omitted. The vomiting ceased, the enlargement of the liver began to subside, and the amount of urine increased, but the physical signs of the heart showed that the organ was considerably affected. As the vomiting had ceased, mouth feeds were resumed, consisting of whey, and bread and butter, and no further vomiting occurred.

On Dec. 7th, nothing was noted except that the child was very listless. The cardiac apex beat was in the nipple line, the action was very irregular, the sounds being of the nature of what Comby graphically calls *faux pas de cœur.* The enlargement of the liver had quite subsided. On the 8th, the twenty-third day of the disease, the peculiar appearance of the child and his inability to use his right arm made the nurse send for me. On arrival I found well-marked palsy of the right lower facial muscles and deviation of the tongue to the paralyzed side. There was complete loss of power in the right upper limb. In the lower extremity the palsy was less complete. Motor aphasia existed. The knee--jerks were absent on both sides. Babinski's sign was present on the right side, the normal flexor response on the left. Ankle-clonus, which was first sought for the following day, was present, and could be elicited until Dec. 17th. The epigastric, abdominal and cremasteric reflexes were deficient on the right, normal on the left side. Sensation did not appear to be affected. The urine, as hitherto, contained a cloud of albumin, but no sugar.

On Dec. 9th, the right foot and lower part of the leg were glossy and edematous and the paralysis in the lower limb was more marked. Spontaneous movements were not performed, but the leg was drawn up when the sole was tickled. On the 10th, the twenty-fifth day of the disease, paralysis of accommodation was observed. The heart was now normal. On the 14th, very slight spontaneous movement of the right foot was first noted. The upper limb was still in a state of flaccid palsy, and the aphasia persisted. The improvement in the motor condition of the lower limb continued until on Dec. 28th, he could move the right limb almost as well as the left. The great toe of the right foot was then found to give a flexor response, but not so well as on the left side.

On Dec. 23rd, the thirty-eighth day of the disease, the child first began to cough over drinks, but no difficulty in swallowing solids was noticed till the 29th, when salivation, pharyngeal gurgling, and choking indicated paralysis of the muscles of deglutition. Mouth feeding was therefore discontinued, and he was given four ounces of peptonized milk with 15 minims of belladonna by a nasal tube every four hours. The cot was raised to allow the excess of mucous and saliva which he could not swallow to drain through his nose. On Jan. 3rd, twenty-six days from the onset of the hemiplegia, slight spontaneous movement of the right arm at the shoulder was first noted, and from that date gradual improvement in its movements occurred, though independent movement of the fingers did not take place till Jan. 7th, 1905, by which time he had so far recovered his power of speech as to be able to say and sing several nursery rhymes. On Jan. 7th, the clearer sound of the voice and the absence of salivation from the mouth, and of the escape of mucous and saliva through the nose, indicated that the pharyngeal palsy was passing off. Soft solids were at first given by the mouth, and by the 9th he was able to take ordinary food well.

On Jan. 11th, fifty-seventh day of the disease he was first propped up in bed, the weakness of the neck muscles was shown by the head rolling from side to side or falling backwards. Massage of the back and of the afflicted limbs was employed and subsequently the faradic current as well. Facial paresis lasted till within a few days of his discharge. Deviation of the tongue to the right continued till Feb. 28th. On Jan 21st, the first day he was allowed up in clothes, he could walk with support, but it was not till Feb. 1st, the seventy-eighth day of the disease that he could stand or walk by himself, even for a few steps. His gait at first in no way suggested previous unilateral loss of power, but was that characteristic of pronounced diphtheritic pseudotabes. As the ataxia passed away, some dragging of the right leg was noticeable, which continued, though with gradual improvement, till the time of his discharge. Mental impairment, to the existence of which in diphtheritic hemiplegia Babinski has drawn special attention, betrayed itself by an unusually vacant expression, which persisted after the facial palsy had disappeared, by torpor and apathy, and especially by amnesia. For some time after he had recovered his power of speech he would frequently forget his own name and address, the names of his nurses, and the letters of the alphabet. On one occasion feces and urine were passed in bed. A vigorous moral tonic was exhibited and incontinence did not recur. Improvement gradually occurred, but it was not until a month after he was first allowed up that he showed any inclination to take an active part in the games of the other children. When he left the hospital on March 23rd, 1905, after a stay of 123 days, his condition was as follows:—He could walk and run fairly well, though with a very perceptible limp. The fingers of the right hand could be moved at will, but were not able to grasp any object. There was no wasting of muscles nor contractures. The cutaneous reflexes were active on both sides, having already returned to the normal on Feb. 14th, the ninety-first day of the disease. The knee- and ankle-jerks, which had been entirely absent till the ninetieth day of disease, were only present on the right side. His speech was unaffected, and there was no obvious mental deficiency. Since leaving the hospital there has been slight improvement, but complete recovery has not been attained.

Though several cases doubtless pass unrecorded, hemiplegia following diphtheria is so uncommon that Slawyk (1), writing in 1898, had been able to collect only 50 cases. A search through literature has enabled me to add 15, thus bringing up the total to 65, including the present one, and another that has occurred subsequently at the same hospital. The earliest of these 15 cases is that of Sir W. Gull (2). Right hemiplegia developed, and was attributed by Gull to cerebral thrombosis. The hemiplegia remained for several months, after which there was slow improvement. In Humphrey's (3) case, a boy of 11 developed right hemiplegia about the fourteenth day of disease, associated with paralysis of the palate, pharynx, and larynx. Death occurred from paralysis of the diaphragm. *Post mortem:* a small area of suppuration with softening of the adjacent brain substance was found in the left cerebral hemisphere. In Rosenthal's (4) case, a girl of 15 developed right hemiplegia in the third week after recovery from the original angina. Paralysis of the palate and diplopia occurred at the same time. The skin upon the affected side was insensible to electrical, thermal, and mechanical stimuli. In Hunter's (5) case, left hemiplegia came on in the third week, and was associated with cycoplegia, paralysis of the soft palate, muscles of the neck and back, and both legs. Sensation was normal. The superficial reflexes were diminished on the left side of the body, and both knee-jerks were entirely absent. Rigidity and slight atrophy of the left arm ensued. Recovery and some improvement occurred. The hemiplegia was regarded by Hunter as due to hemorrhage into the right internal capsule. Wohlgemuth's (6) case was that of a girl, æt. 8. Right hemiplegia occurred at the thirty-second day. No cardiac disease was present, but much albuminuria. Recovery took place. Woollacott (7) says that in 4,000 consecutive cases of diphtheria at the Eastern Hospital, hemiplegia occurred only twice. Both patients recovered. It is interesting to note in this connection that the present case is the first of the two solitary instances of hemiplegia that have been met with among 4,407 consecutive cases of diphtheria that have been admitted to the Grove Hospital since it was opened in 1899. The other case was that of a girl, æt. 5. The intial faucial attack was very severe. Palatal paresis occurred on the tenth day. On the fifteenth the heart showed signs of dilatation. On the seventeenth, right hemiplegia occurred. On the eighteenth, death took place, ushered in by coma. Albuminuria was present on the seventh, and persisted till death. No autopsy was held, but cerebral embolism was probably the cause of the hemiplegia. In Mariottini's (8) case, a few days after the subsidence of the angina, endocarditis and left hemiplegia developed. .*Post mortem:* A focus of softening was found in the external capsule, corpus striatum, and internal capsule. The hemiplegia was caused in this case by an embolus due to endocarditis. In Breton's (9) case, the girl, æt. 3, had right hemiplegia and livid spots, followed by gangrene, on the left leg. The hemiplegia persisted for eight months, though the child could walk by dragging her leg. There was doubtless in this case endocarditis and multiple emboli. Teillais (10) recorded 3 cases in children, æt. 6, 7, and 9 respectively, in which hemiplegia was associated with ocular and palatal palsies and attributed the phenomena to cerebral hemorrhage. Two recovered, one died. Knoepfelmacher (11) recorded a case of right hemiplegia, preceded by early affection of the palate, in a girl, æt. 4. Recovery took place, but the paralysis persisted. He regarded an encephalitis, with lesser probability an apoplexy, as responsible for the condition. Of the 65 cases, 20 were males, 30 females. In 15 the sex was not given. The ages of the patients ranged from 1½ to 15 years. Right hemiplegia occurred in 38, and left in 22. In 5 no details were given.

The occurrence of the hemiplegia took place at the following dates. In the first week no cases, in the second 9, in the third 20, in the fourth to sixth, 11. In 14 cases where no exact date is given it is said to have developed in convalescence, in 11 cases no time is given. Recovery took place in 33, death in 18; in 4 no details are given.

Autopsies were held in 15 cases. HEMORRHAGE was found in 1, THROMBOSIS in two, EMBOLISM in 10, EMBOLISM and THROMBOSIS in 1, SCLEROTIC ATROPHY ONE HEMISPHERE in 1.

In all the cases where details have been given the initial faucial attack was severe. Albuminuria and ordinary diphtheritic paralysis were present in a large number. Complete recovery was rare. Levi (12) instances only 4 such cases. Almost always contractures and atrophy have supervened in the paralysed limbs. Hemichorea, athetosis, and idiocy are mentioned by Slawyk as sequelæ. Sensibility in most cases was intact. In this respect Rosenthal's case, just quoted, was a remarkable exception. It must be remembered, however, that most of the cases occurred in young children, in whom an accurate estimation of disturbance of sensibility is impracticable.

As Babinski (1-3) has clearly shown, hemiplegia differs from all other palsies of diphtheria in being primarily a vascular lesion. Thrombosis, embolism, and hemorrhagic encephalitis are the respective pathological states which give rise to the condition. The nervous system is not primarily attacked as in the common form of diphtheritic paralysis, but secondarily affected by damage to its blood--supply in one of the three ways mentioned. Slawyk accentuated the fact that a clinical distinction between embolism, thrombosis, and hemorrhage is impossible, so that in the present case the exact nature of the cerebral lesion cannot be determined. From the definite evidence of cardiac mischief, the probability is in favor of embolism being the cause, as in 10 out of 15 recorded cases in which an autopsy was held. Embolism in malignant diphtheria may be met with in other sites than the cerebral circulation. In

Abercrombie's case (14), infarcts were found in the kidneys and spleen. A case of pulmonary and femoral embolism was reported by Poupow (15). Marfan (16) recently narrated at the Société de Pédiatrie at Paris the history of a case of embolism of the abdominal aorta during convalescence from malignant diphtheria. Precocious palatal palsy, enlargement of the liver, and alteration of the normal cardiac sounds preceded the onset of symptoms as in the case under discussion.

Among other features of interest in this case are the early onset of palatal palsy and enlargement of the liver characteristic of the malignant forms of diphtheria (17), the association of characteristic diphtheritic palsies concurrent with the hemiplegia, the triviality of the serum manifestations in spite of the massive doses of antitoxin (18), and the alternate administration of belladonna and bromide of potassium in cardiac vomiting suggested to me first by Dr. Garratt (19).

I am indebted to Dr. J. E. Beggs, medical superintendent of the Grove Fever Hospital, for permission to publish this case.

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NASAL DIPHTHERIA.*

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Diphtheria occurs in the nasal passages as a primary affection, and again as a secondary one, through membranous extension, usually from the pharynx. As a primary disease it is rare and differs markedly from the secondary invasion in symptomatology, course, prognosis and danger of transmission. The relation of the following case illustrates how easily the true nature of primary nasal diphtheria may be overlooked and remain an unappreciated focus for the infection of others innocently exposed thereto.

November 16, 1904, Gilbert, the five-year-old son of Mr. K., was brought to my office for treatment of a nasal trouble that compelled him to breathe through the mouth. The father stated that after some five days' treatment by the family doctor he had advised that the child be taken to a specialist. I found the nostrils, more especially the right, obstructed by a greyish-white membrane covering the septum and turbinal bodies. The upper lip was slightly excoriated, due to an acrid, watery, more or less muco-purulent nasal discharge. Portions of the membrane were removed with the forceps leaving a reddened and bleeding surface beneath. The constitutional disturbance was that usually in association with an acute catarrhal rhinitis. The pharynx and tonsils were free from disease, but the posterior submaxillary glands were slightly enlarged and tender.

Treatment.—The nose was sprayed with peroxide of hydrogen, and the father directed to keep the child at home and repeat the spraying with the peroxide every two hours. The remaining children in the household, an older and a younger son, were isolated in another part of the house.

On the following day I visited the patient and found the condition of the nose and throat unchanged. By the next day, however, the membrane had extended along the posterior wall of the pharynx and onto the tonsils. An injection of 2,000 units of antitoxin was forthwith administered and the peroxide spray continued. By the following day there was extension of the membrane into the larynx, but a decrease in the degree of nasal obstruction. An injection of 3,000 units of antitoxin was given. By the next day the diphtheritic membrane in the nose and throat had been exfoliated, and the child thereafter made an uninterrupted recovery.

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At each daily visit the two isolated children were regularly examined. On November 21 the elder of the two had developed a case of ordinary pharyngeal diphtheria, the two tonsils being likewise covered by the membrane. An injection of 3,000 units of antitoxin was administered, while to the younger child, still free from the disease, an immunizing dose of 500 units was given. The one child made a rapid recovery while the other escaped the disease altogether.

Authors[1] describe primary nasal diphtheria as an acute and again as a more or less chronic affection. In the latter the membranous deposits are expelled and reformed for a period of weeks to three months. Monte[2] states that the nursing child during its first six weeks of life may develop nasal diphtheria without connection with epidemic disease, but due to infection through the maternal genital organs.

The early symptoms of primary nasal diphtheria are more or less obstruction to nasal breathing, a thin watery discharge, soon becoming more or less purulent and irritating to the cutaneous surface of the upper lip. Upon inspection a flat greyish membrane is seen in the vestibule, especially at the anterior extremity of the septum, surrounded by an inflammatory areola. The disease may remain limited to this area and to one nostril, in which case most likely the infection has secured an entrance through local mechanical irritation, as pricking the nose with a sharp finger nail or bruising the parts with a rough and infected handkerchief.

Constitutional disturbances are either wanting or slight, and such as loss of appetite, indisposition to exertion, and from one-half to one degree of fever. Slight swelling and tenderness of the posterior submaxillary and cervical lymphatic glands must be sought for, and when found in connection with a pseudo-nasal membrane, is highly suspicious of diphtheritic infection. The disease, as a rule, shows little tendency to spread to the pharynx, and the symptoms are often so little pronounced that the true nature of the disease may escape recognition until, perhaps, another exposed child develops an attack of pharyngeal diphtheria. Fortunately, the contagious nature of a primary nasal diphtheria, as a rule, is not great, from some unexplained reason, and the liability of infecting others exposed is much less than in diphtheria affecting other parts of the body. Likewise the prognosis, in contradistinction to that in secondary diphtheritic nasal involvement, is highly favorable, hemorrhage and general sepsis being of frequent occurrence.

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[1] Bosworth, in Burnett's System of Diseases of the Ear, Nose and Throat.

[2] Monte: "Ueber Croup and Diphtheria in Kindesalter," 2 Auflage, 1884.

The disease with which it is easiest confounded is fibrous rhinitis following upon intra-nasal cauterization, either chemical or thermal, or genuine primary fibrous rhinitis, also termed nasal croup. In recent years the number of authorities who hold nasal croup and nasal diphtheria as one and the same disease have increased. Still, there remain an inconsiderable number, including B. Fraenkel. Störck, Rethi and others, who state they have not been able to find the bacillus diphtheriae in the fibrous disease. Gerber and Podack,[3] who recently have studied the subject, while admitting that micro-organisms, such as the staphylococupyogenes aureus and Fraenkel's diplococcus, may cause a croupous membrane, still believe that in the greater majority of cases the disease must be recognized as diphtheritic in nature and treated as such. Anatomicopathologically considered, the membrane in croup and diphtheria is identical in structure. The fact that in croup the exudate, as a rule, is thinner, more superficial and in loose connection with the mucuos membrane, and hence easily removed, whereas in diphtheria it is thicker and infiltrates epithelial covering, basal membrane and submucous connective tissue, rendering it more difficult of removal, is accounted for bv the degree of epithelial and connective tissue necrosis resulting from the bacterial infection. In both instances the false membrane is made up of layers of fibrinous coagulation enclosing in its meshes epithelial cells, pus cells, myriads of bacteria and frequently blood cells. After all has been said, and since neither the seeming non-contagious nature, nor the benign character of fibrous rhinitis suffice in a differentiation from diphtheria, we must rely on microscopic examination, culture for and detection of the Klebs-Loeffler bacillus, with experimental inoculation, in reaching our diagnosis.

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[3] Gerber and Podack; Deut. Archieves fuer klin. med., Band 54, 1895.

The early recognition of nasal involvement through membranous extension from the pharynx is of prime importance, not only because of the necessity for at once instituting local treatment, but also because our prognosis at once becomes more grave through the increased liability of septic poisoning by reason of the defective nasal drainage.

One of the early symptoms is nasal hemorrhage, due to hyperemia preceding the membranous formation. At a later period in the disease the bleeding is connected with ulceration, inclines to be profuse and recurrent, leading to great prostration and offering difficulty for its arrest. Pre-existing fever is increased, or if the temperature has been normal a recurrence may follow of an intermittent nature. With the first appearance of a pseudo-membrane nasal obstruction arises; likewise nasal discharge, first of a dirty yellowish and watery nature, later more or less muco-purulent and containing portions of the exfoliated diphtheritic membrane. When the diphtheria is of the gangrenous variety the discharge is not only highly offensive and deeply excoriating to the cutaneous surface of the upper lip, with which it comes in contact, but decidedly tarry in consistence. Enlargement of the cervical lymphatic glands is almost without exception found at some stage of the disease. Because of the swollen pharynx, posterior rhinoscopic examination cannot be made, and we depend upon anterior examination in establishing the presence and area of the membranous deposit.

Prognosis, as already mentioned, is grave in secondary nasal diphtheria, which has a much higher mortality than either the primary nasal or the ordinary pharyngeal variety.

Treatment consists of isolation, even in doubtful cases; early administration of antitoxin and local nasal cleansing. The last is accomplished with the syringe, douche or spray. As a cleansing agent I prefer peroxide of hydrogen. Lime water or diluted Dobell's solution is equally valuable. When the nasal discharge is offensive permanganate of potash is resorted to. For the arrest of nasal hemorrhage, or as a preventative of the same during the removal of inspissated secretions, no other remedy is as useful as spraying the nose with some preparation of suprarenal extract. After the nose has been cleansed insufflation of aristol, dermatol or like powder may be made.

SOME POINTS IN THE EPIDEMIOLOGY OF CEREBROSPINAL MENINGITIS.[1]

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Cerebrospinal fever, or cerebrospinal meningitis, offers more anomalies, perhaps, than any other important epidemic disease. Its history can be traced with certainty for about a hundred years. As this is also the period of exact methods of medical diagnosis and classification, it may be assumed that it prevailed in previous centuries, but it was not accurately described. It usually appears in fairly synchronic epidemics in more than one civilized country, indeed, in nearly every country of Europe and America. In this respect it resembles influenza and, like that disease, has been called a pandemic disease. Nevertheless, if the details of the distribution of cases be looked into more closely, they will often be found inconsistent with any theory of a wide-spread influence causing the disease, and we shall be led to believe that it spreads along the lines of association like a contagious disease. Thus it has been repeatedly noticed to spread through the army of France and other European countries, while the civil population in the vicinity of the garrisons practically escaped. In the recent epidemic in the United States the cities from Boston to Newark, N. J., suffered severely, while Philadelphia and the cities of Pennsylvania and New York were comparatively free from the disease. Somewhat numerous cases and deaths were reported from some places further west, though nowhere else in such proportionate numbers as in New England and at the mouth of the Hudson. All the suburban cities around New York suffered in a like degree with the metropolis, while Philadelphia and its suburbs, so close by and receiving such a stream of travel from New York, remained unaffected. During 1904 there were several hundred deaths in New York while but four are given in the report of vital statistics of Philadelphia for that year. This is the more remarkable since the cases of the disease in New York were quite evenly distributed in the various wards. If we were to draw an inference from these facts, we should have to conclude that the disease is readily spread by travelers on trolley cars and accommodation trains, but not by the travel of express trains. This in itself is absurd. There is one fact, insufficient but still accounting for part of this anomalous state of affairs; namely, that children comprise an overwhelming majority of the patients. They are travelers in a much less degree and for much shorter distances than their elders.

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[1] Pennsylvania Medical Journal.

In the distribution of cases among the houses of a place, the facts seem inconsistent with a theory of either contagion or noncontagion. In general the cases appear singly in houses. This is true of the overwhelming majority of houses where cases are found. In these households a multitude of persons of the most varied ages who have never previously had the disease, have been exposed to the case, as far as association can cause exposure, and yet remain well. On the other hand, in a small part of the houses, two, three and even four cases are found. So that when those who follow the epidemic have about made up their minds that the disease does not require isolation, they are suddenly confronted with what looks like the disastrous result of free exposure.

Another fact that seems inconsistent with an hypothesis of contagion is the escape of other patients in the wards of hospitals into which cases of epidemic cerebrospinal fever are introduced for treatment. Until toward the close of the recent epidemic in New York, hundreds of patients were treated in Bellevue hospital without accident to other patients, physicians or nurses. At the time the writer was there, thirty cases were under treatment. Toward the end of the epidemic the cases were removed to a special ward, but not because of a spread of the disease in the institution.

It is a well-known fact that while epidemics of cerebrospinal fever appear only at intervals of many years, a small number of cases resembling the epidemic cases as closely as the epidemic cases resemble each other, are to be found, in all large places at least, in the intermediate years. These are called sporadic cases. But sporadic explains nothing. To call a case sporadic is only a short way of saying that a case has appeared in a community otherwise free from disease, that its origin can not be explained and that no subsequent cases arose from it. This is simply the statement of an unexplained fact.

It is well known that all meningitides are cerebrospinal. The acute forms, consequently, bear a close resemblance to each other no matter what the specific cause of the disturbance, for the symptoms are little more than the disturbance of the functions of the brain and cord that any pathogenic germ could cause if capable of exciting irritation and inflammation when spread through the arachnoid fluid. If the subarachnoid spaces were more accessible we should have a great variety of cerebrospinal meningitides. It is likely that the membrane itself has as little resisting power as the peritoneum. There are, in fact, more than one kind of bacteria found on the meninges of persons dying of cerebrospinal symptoms. Besides the micrococcus intracellularis of Weichselbaum, the most common are the pneumococcus, the streptococcus, and staphylococci of suppuration. Meningitis is also a not uncommon complication of other specific diseases. Sometimes more than one kind of these bacteria may be found in the same case. Notably the staphylococci may be found with the others. It should be taken into account that the rarer but more specific germ may be missed, though present, when the examination is made from fluid obtained by lumbar puncture during life. Such a specimen does not necessarily represent the whole of the cerebrospinal surface. After death we deal only with terminal conditions. During epidemics, in such investigations as have been made, the great majority of cases have shown Weichselbaum's meningococcus. I believe none of the observers have found this organism in all cases tested. The anomalous fact remains to be stated that Weichselbaum's organism is also found in many of the sporadic cases in the interval of epidemics.

If we take the meningococcus as the cause of the epidemic form of the disease, we are left without an explanation of why the propagation of cases goes on so slowly for so many years, and then suddenly swells for a year or two to epidemic dimensions. These variations cannot be compared with the cyclical variations of epidemic diseases in general, because there is never but the most trifling proportion of survivors of cerebrospinal fever in the community. In the others the increased proportion of immunes necessarily restrains the epidemic.

Cholera and yellow fever do not present the same features as cerebrospinal fever, since they disappear *in toto* except in the restricted regions where they are continuously epidemic, though in a variable degree.

The facts of epidemic and sporadic cerebrospinal meningitis thus seem anomalous. On the whole, we are bound to believe that it is a transmissable disease without being able to explain why contagion should be so uncertain. It seems wisest in the present state of our knowledge, to isolate cases and otherwise treat them as offering the danger of a contagious disease to the surrounding community. The weight of evidence, too, is strongly in favor of the meningococcus of Weichselbaum as the specific cause, though the demonstration cannot be regarded as complete. This germ has been found not only on the meninges, but also in the nasal passages, the throat, bronchi, and middle ear, both of persons suffering from the disease and others showing no symptoms. In this respect it resembles the pneumococcus and the suppurative organisms also found associated with meningitis.

It has seemed to the writer that some of these anomalies could be explained on the supposition that cerebrospinal fever is not the primary condition, but the complication of a disorder, either trifling in character or not even a disease. The cases of meningitis would bear the same relation to this underlying condition that meningitis cases bear to scarlet fever. Another illustration that might be offered is the meningitis cases so numerous in some influenza epidemics. These are often diagnosed cerebrospinal meningitis. In 1891 in Pittsburg one hundred and seventy-two deaths were attributed to that cause. That was one of the worst years of the recent influenza cycle.

If the underlying conditions were trifling in character, presenting symptoms say of a slight cold, except in unusual cases, when it extended to the meninges, only the cerebrospinal cases would attract attention, and these would commonly exist in persons who had not been in contact with each other, a rule to which, however, there would be some exceptions. The real chain of contact is the succession of persons who have the trifling disorder, and who have all been in association. To illustrate this let us suppose a child of family A has scarlet fever with a meningeal complication. From it the disease is propagated to family B without meningeal complication; so in succession it comes along the line of association until the contagion reaches family N, who have no association with family A but give the next meningeal case in the series. Without a recognition of the underlying scarlet fever, the meningitis of family A would appear to have nothing to do with that of N.

We look at bacteriological facts from a purely human standpoint. In an epidemic, a certain species of bacteria is propagating along a row of human beings, like the parasites which pass from tree to tree in the forest. From the standpoint of the bacteria the phenomenon is just the same whether they harm their host or not.

It seems to the writer possible that a bacterium with little or no pathogenic effect upon other tissues than the meninges, varying in virulence as do all infections, capable of temporary parasitism upon a human host, and reaching the meninges of only about one person in a hundred to whom it is communicated, would make possible such a distribution of cases as is actually found in epidemics of cerebrospinal fever.

In this connection let us note the fact that the disease is often preceded or begins with a coryza, pharyngitis, or the like, together with the finding of Weichselbaum's bacillus in the air passages both of affected and unaffected persons. There must, of course, be a portal of entry, or the meninges never could be invaded. The disturbances resulting from pathological changes at the site of implantation are utterly overshadowed by the cerebrospinal symptoms. If the patient nticed only some stuffiness in the head or other symptom of a slight cold, these symptoms would not seem connected with later developments.

All this is certain enough. The writer wishes to point out that what is going on in the bacteriological world is the transplantation of parasites from human being to human being. If these parasites are nonpathogenic, we take no notice of the fact. If they are pathogenic and can induce marked changes at the site of implantation or can produce characteristic symptoms on at least most of their hosts, we recognize an epidemic disease. If they are not pathogenic or but slightly pathogenic to the tissues on which they are emplanted, but can do damage only rarely when they reach cavities like those of the nervous system, then the epidemic must consist mainly of apparently disconnected cases.

An hypothesis of this kind has little value until it is confirmed. The epidemic of cerebrospinal fever failed to reach Pittsburg and the writer could go no further than to suggest an hypothesis.

SOME PRACTICAL OBSERVATIONS UPON MENINGITIS.[1]

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In my first paper, I pointed out how closely acute infantile paralysis may simulate meningitis. Cerebral symptoms in whooping-cough may also simulate tuberculous meningitis very closely, as in the case of a girl in whom a convulsion occurred with almost every paroxysm of coughing.

The absence of some cardinal symptom is a frequent cause of difficulty in the diagnosis of tuberculous meningitis, and one finds oneself wondering whether headache can be absent, or vomiting, or a cranial nerve paralysis. There is no doubt that one of these symptoms may be wanting, sometimes throughout the illness, often until the diagnosis has become only too obvious.

A sudden attack of convulsions as the first definite symptom was once very closely brought home to me when a house-physician. A child had been taken to the waiting room as slightly ailing, and the mother had left the room to give the history of the illness. Suddenly the child was seized with convulsions, and in half an hour was all but dead; the mother who had been sent for accused me of chloroforming her child, or otherwise damaging it, for she had left it apparently almost healthy. This child rallied, but never became sensible again, and died three weeks later. Surgeons on the other hand are well acquainted with the insidious onset of tuberculous meningitis, which sometimes may occur after operations. A slight attack of vomiting attributed to the chloroform, a slight squint, and a deepening coma may find one taken unaware until the patient is clearly moribund.

With elderly people tuberculous meningitis may also be most puzzling. Thus, for example, constant headache and mental aberration were the prominent symptoms in two such cases occurring over the age of 50.

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[1] The Medical Press.

Still more confusing and most deceptive are those cases which occur in young anemic and emotional women. By a strange coincidence I saw two of these cases within a month, and in both wild excitement at night had first alarmed the friends, and one of these patients in her excitement had torn up her clothes. Both of these cases had been mistaken for hysteria, and both patients died within a fortnight. It is noteworthy that in both also, when they were first seen, there had been headache and fever, a combination which must always suggest caution.

The nervous symptoms in babies associated with teething and with slight middle-ear disease are sometimes excessively puzzling. It is then that special care is needed in judging of the relative values of the symptoms. A definite paralysis such as ptosis, for example, or divergent strabismus, is far more reliable proof of meningitis than is retraction of the head, screaming, or vomiting. Irregular sighing breathing means more than aimless movements of the eyes, and optic neuritis far outweighs the tache cerebrale.

These numerous difficulties lead me to speak of some of the newer methods in diagnosis. Kernig's sign is one, and has attracted great attention.

A method of eliciting it is as follows:—With the patient recumbent, the leg is extended on the thigh and the thigh is then flexed on the abdomen, the tension on the nerve roots of the great sciatic produces instant flexion of the knee upon thigh on account of the meningeal inflammation. It is a sign much valued in cerebro-spinal fever. I have, however, been disappointed with it in tuberculous meningitis.

Another important method which has come into great favor of late is lumbar puncture. It is not difficult. The patient is placed on the right side, and the back arched with its convexity towards the operator. An excellent landmark is a line drawn across from the top of one posterior iliac spine to the other. The next vertebral spine above this line is marked, and the needle inserted immediately above it, and about a quarter inch to one side of it. Some with great experience prefer the middle line. Local anesthesia, or a whiff or two of chloroform for a child, is sufficient. The needle in the case of a child will pass inward about one and one half inches before reaching the canal, whereas in an adult the distance will be about two inches.

The value of this method in treatment is very limited, but we have recently had the weighty opinion of Professor Osler that it may afford much relief when there is evidence of acute tension in the cerebro-spinal system, as shown by urgent headache and vomiting or rapid coma, and in infants by a very tense fontanelle.

Its use is more extensive in diagnosis. I have never myself seen any evil consequences, and it is now used so frequently that it hardly seems that there can be any special risk about this procedure. I have, however, I confess, heard ugly rumors about ill consequences, such as collapse, but cannot substantiate these from personal observation. Its value is not, however, comparable to an exploration of the pleura. We know if we explore a pleural cavity that we shall often not only clear up a diagnosis but also get a direct lead in the treatment, of lumbar puncture the same can hardly be said. The diagnostic value also depends upon considerable technical skill in the making of cultures and films, and in the detection of micro-organisms, a point very clearly brought out by Dr. Horder in the recent discussion on meningitis at the Leicester Meeting. It is a method that personally I do not employ, unless the uncertainity of the case needs every expedient for its elucidation. Operative treatment in tuberculous meningitis is recognized at present as inadmissible, but in post-basic meningitis the possibility of treating the hydrocephalus by drainage has been repeatedly advocated and the operation has been frequently done. The lateral ventricles have been drained, and in one classical case of Lees and Ballance which I had the good fortune to see, a remarkable recovery ensued. Other cases have been recorded, but the usual result is complete failure. It has been my misfortune to have had many of these cases at one time or another under my care, but up to the present I have never seen any operative success with them. Whether taken early or late they have all died. In the most successful case the patient lived for some months, but I do not think there was any real improvement, or that the tube had kept its position in the brain, and acted as a drain. We know the pitiful state of hydrocephalic children if they are left. And it seems certain that if you want success, the case must be taken early, but the risk is tremendous. The parents are often enough clamorous for the operation, and there is no denying the fact that some remarkable results have been obtained, and I suppose if the parents thoroughly understand the terrible risk of the operation this should be sufficient to encourage us to hope that in each carefully chosen case we may be successful. Patients with post-basic meningitis sometimes, however, recover in a remarkable way without operation; but even then sometimes they die in the near future quite unexpectedly and suddenly. The disease itself is at the present time looked upon as of the same nature as the cerebro-spinal fever of which we have recently heard so much from America and Silesia. The diplococcus demonstrated by Dr. Still is now thought to be identical with the meningococcus of Weischlebaum, the cause of cerebro-spinal fever. I doubt the actual identity of these two diseases.

Post-basic meningitis, though often of long duration, is very fatal. Because there is recovery it seems and is more hopeful than the tuberculous form, but the recovery is sometimes very imperfect, and such traces are left as chronic hydrocephalus, blindness or deafness, epilepsy and idiocy or weak-mindedness. In judging of the severity of a case, vomiting, wasting, fever, and supervention of hydrocephalus are valuable guides. The onset may be most insidious. A slight convulsion, irritability, some rigidity of the neck, or abnormal movements of the eyeballs, with occasional vomiting may be the only symptoms, and these disappearing may leave only a mysterious wasting and fever. A remarkable complication is the occurrence of swelling around the joints. These swellings are usually periarticular, but I have seen, together with hydrocephalus, both knee-joints full of fluid. Such success as I have had in treatment has been by attention to minute details, gaining rest by small doses of chloral and bromide, and restraining sickness by peptonizing the milk, and giving bismuth and alkalies, relieving pain by small doses of opium, and treating constipation by the cautious use of mercurials and salines. I have already spoken of hydrocephalus.

Pneumococcal meningitis would seem to be invariably fatal, but the great difficulty in childhood is to ascertain when this meningitis is present. It may seem paradoxical, but patients who appear to be doomed to acute meningitis recover and patients in whom meningitis is not even thought of die from this cause.

Thus, for example, an only child, æt. 1 year and four months, whom I saw with Dr. Chatterton, of Hornsey, had been ailing and fretful for a month, and five days before I saw him had become suddenly worse with screaming, vomiting, constipation and extreme illness.

This child lay in its cot unconscious to its parents, with a temperature of 100°. There was sharp screaming at intervals and and the neck was stiff. On the other hand, there was rapid and grunting breathing, there were no paralyses, and Kernig's symptom was absent. We found a little patch of tubular breathing at the lower angle of the right scapula.

The infant seemed certain to die from a pneumococcal infection of the lungs and meninges, but it made a rapid and perfect recovery a week from that time.

On the other hand, marasmic children with broncho-pneumonia die of suppurative meningitis without showing a single symptom except possibly some screaming and then coma. Such cases are almost invariably mistaken for tuberculosis of the lungs or are overlooked. A little girl in the University College Hospital last month died with empyema, malignant endocarditis, suppurative pericarditis, and meningitis, showed no symptoms except vomiting and a terminal delirium, both of which could have been explained by the heart disease.

Time will not permit to enter at length upon the sequelæ of meningitis. Hydrocephalus, blindness, idiocy and epilepsy have all been incidentally mentioned. Sometimes remarkable functional symptoms appear, and there is difficulty in ascertaining to what extent we are dealing with symptoms of organic disease, or functional disturbances.

For example, a young man, æt 17, had a severe attack of erysipelas of the scalp in October, 1897, which affected the meninges. as shown by double optic neuritis, severe headache, mental hebetude, and vomiting. From this he made a remarkable recovery, but a month later, after becoming quite convalescent, headache and vomiting reappeared and he then lost power in his legs and control over his bladder. In this state he remained for close upon two years, and then made a complete recovery under persistent Faradism.

It is impossible to believe in this case that the majority of those serious symptoms were the results of organic disease, for the recovery was both rapid and complete, and further was apparently permanent, for I saw this patient a year later in admirable health and hard at work again.

Epilepsy is recognized as a sequela of many organic diseases of the brain. It, for example, will be met with in some cases of recovery from post-basal meningitis, and also after polio-encephalitis. The development of this epilepsy may be delayed for a long period of time; it may be *petit mal* or *grand mal,* or both combined. On the other hand, the epileptic condition may supervene rapidly and the condition of the patient can hardly be then called one of recovery.

Epilepsy, too, is sometimes an evidence of congenital sypilitic meningitis—the acquired syphilitic cerebral disease in adults is a too important and wide subject to touch upon now. Those curious coincidences of hospital practice have brought two of these cases prominently before my notice recently. Both were boys, both developed epilepsy about seven years of age, in both after about eighteen months I detected enlargement of the liver, and one developed ascites. Both died with obscure cerebral symptoms complicating the epilepsy, and both had cirrhotic livers. Such cases have been described by Dr. Ormerod. The thickening of the pia mater was well shown in the brain in the second case, and the vessels at the base were rigid and unduly patent.

In such cases if one can detect them, mercurials and iodides are clearly needed in addition to the bromides for the treatment of the epileptic state.

An important after result of meningitis is a permanent weakness of the mind. Thus a child, æt. 12, who had suffered from posterior basic meningitis at six months and was then in the Great Ormond Street Hospital, with retraction of the head, fever, blindness and other symptoms of the disease, is now a big, well-nourished girl, with her sight restored, enjoying excellent health, but quite feeble-minded, though good-tempered and able to carry a simple message. In cases such as these it is very probable that there is some degree of permanent hydrocephalus.

Finally, I am afraid that up to the present I have never seen any recognizable improvement from serum treatment in tuberculous meningitis, and Wright's method of vaccination is not, as he has himself insisted, suitable in its present state of development for use in acute tuberculous meningitis.

MORTALITY OF CHILDREN UNDER ONE YEAR.

By Professor Dr. Axel Johannesen,

CHRISTIANA UNIVERSITY, SWEDEN.

The great mortality during the first year of life has for many years been the subject of discussion. The fact that it appears greatly to vary in different countries, while in the same country it varies only slightly led to the inference that certain peculiarities in each country determine the infant mortality. When about the middle of the nineteenth century statistics were first collected, the variations were regarded as due to altitude and climatic conditions but, as other causes came up for discussion, this view was soon abandoned.

The deduction from Casper's researches among the nobility and the poor in Berlin (1825), that poverty is the chief cause of infant mortality, was again considered as well as such conditions as war and famine, racial characteristics and habits, the occupations of the parents, the relation between the age of the parents and the vitality of the offspring and the productivity of the population, which has a known relation, since the more children are born the more die. Now, however, it is conceded that although many of these conditions are important, the determining factors upon mortality during the first year of life are food and care. This was asserted by Monot and Vacker in France and by Hoffman Cless in Germany (1870) and is now generally accepted. The attempt to determine the effect of conditions like temperature, climate and humidity fails and the investigation turns to artificial feeding and effects of bacteria or the poisons produced by these upon the child's health. The influence, moreover, of such conditions as social station and occupation finally resolves itself into the question of care and food, because, for example, it is evident that a mother working in a factory has little chance either to nurse her child or wisely and sufficiently to feed him by artificial means.

So whether the infant mortality be highest in the town or the country, in an agricultural or an industrial community, in the hills or in the valleys, one is always led back to the conclusion that the question is one of nourishment. If this is true, the chief causes of death during the first year of life must be diseases due to the peculiar conditions of nutrition, gastric and intestinal diseases, which may either directly destroy life or induce fatal diseases in other organs. There are in addition, but less important as causes of death during the first year, the infectious diseases, from tuberculosis and lues to measles and scarlet fever.

Statistics upon infant mortality in the various European cities are as follows: Wurtemberg has the highest percentage, showing from 1862-1868, 36 per cent. and 33.2 per cent., and a decrease in the last twenty-five years of 10 per cent. Bavaria for the same period showed 31.9 per cent. with a decrease of about 6 per cent. in 25 years. Saxonia 28.7 per cent.—25.3 per cent; Austria 26.4 per cent.—22.9 per cent.; Prussia and Italy, between 25.5 and 16.7 per cent.; France 18.4 per cent.—15.6 per cent.; England 15 per cent.; Finland varies between 22.5 per cent. and 13.8 per cent. Denmark shows a lower and more even percentage, 14.6 per cent.—12.8 per cent.; Scotland 12 per cent.; Sweden varies between 21.2 per cent. and 9.8 per cent.; Ireland and Norway show the lowest percentage, less than 10 per cent.

The reason for this comparatively favorable condition in Norway lies in the fact that the mothers usually nurse their children. When, however, the children are boarded out, they are generally well treated and given fresh milk which is easy to obtain, a very important item if a child is artificially fed.

The reports show that the mortality in all countries is greater among boys than among girls. The average percentage for the period 1876-1898 was 10.61 for boys, 8.94 for girls (Norway).

A question which constantly arises in the investigations and about which opinion differs, is whether illegally born children show a higher mortality at this age than those legally born. By Eross in Berlin the mortality among the illegally born was found to be almost double that among the legally born, in Paris only a little larger and in Vienna and Prague considerably smaller (Fischl).

The causes of this great difference between the legally born and illegally born have been sought in the peculiar circumstances surrounding the illegally born children:—

1. It may be that several of the infants who in the death certificate are put down as legally born, are in reality illegally born,

the mother in the meantime having contracted marriage with the father of the child or another man.

2. These children often change residence, being born in a maternity hospital or other place in the city, but often sent to the country to be raised.

3. They may be born in the country at the home of the mother and afterwards boarded out in the city, where the mother earns her living.

The average death rate in Norway for the period 1876-1898 was 9.36 per cent. for legally born, 15.03 per cent. for illegally born children. This shows a decidedly higher mortality among the illegally born, great numbers of whom die in the cities. It must be remembered that at the present time the account of children who die immediately after birth is comparatively accurate, while formerly many such were reported still-born. In Norway, it appears that in the cities the number of children illegally born about corresponds with the number artificially fed and the death rate of the illegally born children in the cities consequently may be taken as an exponent of the death of children artificially fed.

The distribution of deaths through the different months of the first year is interesting: The rate in the first month is more than one-half that of the next eleven months and the ratio between the deaths of legally and illegally born children in the first month is 1 : 1.5 in the country and 1 : 2 in the cities. In the second month the ratio in rural districts goes down to 1 : 1.3 while in cities it goes up to 1 : 3. This increase seems due largely to the fact, that a great number of the illegally born children, hitherto breast fed are, at this time, sent out to board and are artificially fed. In the cities the following months show a still higher mortality for the illegally born children, while in the rural districts the difference in the death rate between legal and illegal children constantly grows less until the last two months when it falls lower for the illegally born children than for the legally born. In the cities the decrease in the proportion of deaths between legally and illegally born children manifests itself when they are weaned, that is after the ninth month.

The opinion that the higher mortality among illegally born children is due to poor nourishment is supported by the number of deaths in the different months. In Norway, unlike most countries, the death rate rises only slightly in the summer. Although July shows the highest number of deaths, August on the other hand has a death rate lower than March, and June lowest of any month between it and January. Investigation shows the death rate for July and August among legally born children to be lower than for January, February, or March, while for the illegally born children it is higher. This statement has reference only to the cities. The number of deaths among the illegally born children in the rural districts is about the same as among the legally born. It is true that in the cities among the legally born children also the mortality is higher in the summer months. Among the illegally born children in the cities the mortality for July is double that of any other month and two and one-half times higher than that of December, which has the lowest rate. So it would seem that in Norway the unfavorable conditions prevail only in the cities and affect especially the children who depend on artificial food.

In regard to this relation between the nourishment and the mortality of infants, I would draw attention to the interesting and important investigation of this subject by Richard Bocks, director of the bureau of statistics in Berlin. Upon the request of the editor of *Deutsche Med. Wochenschrift* it was decided that after Jan. 1, 1878, the death certificate of infants should state the mode of nourishment. The next year the desirability of the census stating the nourishment of all living children was urged and since 1885 this has been done.

In each month of the first year out of every 1,000 children variously fed, the following died:

		1885	1890	1895
1.	Mother's milk	7.6	7.23	6.25
2.	Wet nurse's milk	7.4	5.64	6.32
3.	Breast milk and cow's milk	23.6	54.42	40.96
4.	Cow's milk alone	45.8	43.94	38.75
5.	Breast milk and artificial food	70.6		35.04
6.	Breast milk, cow's milk and artificial food	213.7	134.41	50.00
7.	Cow's milk, and artificial food	128.7		46.11
8.	Artificial food alone	74.8	56.3	92.24
9.	Other nourishment	28.7	29.4	18.29

The great difference in mortality between breast-fed children and those artificially fed is here clearly shown and what the ratio represents in actual value may be grasped from a note in *Statistische Jahrbuch der Stadt Berlin 1885:* "If all the children had shown the same mortality as the breast-fed ones there would in the first eleven months have been 2,849 deaths instead of the 9,367 as recorded, in other words 6,518 lives would have been spared." Although this number may be exaggerated, since it takes for granted that the breast-fed children apart from the nourishment have in other respects, too, advantages over the artificially fed children, the number is still great enough to attract attention and now when the circumstances which gave rise to the ratio are known and combatted the death rate for infant mortality in Berlin has gone down from 27.3 per cent. in 1885 to 23.3 per cent. in 1895.

SOCIETY PROCEEDINGS

BETHESDA PEDIATRIC SOCIETY.

Regular Meeting Jan. 26th, 1906.

Dr. John Zahorsky reported four cases of Acute Infection of the Urinary Tract in infants. He called special attention to the fact that an acute fever in an infant may be caused by an infection of the urinary tract, without being accompanied by any striking local symptoms. In all cases of acute fever, the cause of which is not found, it is necessary to examine the urine. The presence of albumin in cloudy urine, which cloudiness does not disappear on the addition of acetic acid or heat suggests a urinary infection. Of course, a microscopical examination of the urine should be made. It is difficult to decide just what part of the urinary tract (pelvis or bladder) is implicated from the urinary findings.

All cases occurred in girls under two years of age, in one only were symptoms referrable to the bladder marked. The clinical picture was that of an irregular fever with marked restlessness; micturition was somewhat more frequent than it was before the illness. The albumin was rather large in quantity during the acute stage, so that it suggested a nephritis.

All recovered in a period of from two to six weeks. Hexamethanamin was given internally.

Discussion of Dr. John Zahorsky's paper on the Acute Infections of the Urinary Tract in Infants.

Dr. Louis M. Warfield said that this question of Acute Infections of the Genito-Urinary Tract in Babies, could not be brought to the attention of the Society too frequently. In a recent case that he had seen through the courtesy of Dr. B. W. Moore, in a girl infant of nine months, with high fever and much pus in the urine, a pure culture of bacillus coli communis was grown from a catherized specimen. This organism is the one most frequently found, although staphylococci have been found, and Abt of Chicago, in a case following a severe gastrointestinal infection had cultivated from the urine of a patient with a typical case of pyelitis, a bacillus which was much like the Shiga bacillus. In the case cited above the patient had died, but unfortunately autopsy was refusel. In such fatal cases, the suggestion of Rotch, that the tubercle bacillus might be the infecting organism should not be forgotten. Search was made for the bacillus in this case.

The infection was more apt to be through the blood than through the bladder, although such cases as three of those reported this evening by Dr. Zahorsky might have been simple cystitis due to infection through the short female urethra. It is known that the kidneys of infants dying from gastro-enteritis show various shades of nephritis. The infection must come from the intestine. Pyelitis and enteritis are so frequently associated that there must be some connection between the two.

The presence of pear-shaped and tailed cells in the sediment of urine does not enable one to differentiate between cystitis and pyelitis.

The importance of examining babies' urine in cases with high irregular fever could not be too strongly emphasized. It was not difficult to obtain specimens of urine from babies. Girl babies could be catherized. A very simple method of obtaining urine from boy babies was to use a revolving ink-well, the smallest size. This has a wide mouth, a neck placed at right angles to the body which is deep and so made that fluid does not readily spill out through the constricted portion of the neck where it joins the body. By fastening such a vessel upside down in the napkin so that the penis is in the bell shabed neck of the vessel, the movements of the baby will not dislodge the vessel and once the urine is in the vessel there is small chance of its being spilled.

Dr. Fisch expressed the opinion that we could not make the diagnosis by finding pyramidal cells; the quantity of albumin is more important. One half per cent. of albumin (Esbach) suggests pyelitis. Coli infections are doubtful; ascending infections are rare in adults, and must be more so in infants.

Large granular casts reflect kidney infection and plus pus make the differential diagnosis of pyelitis easy.

Dr. Lippe called attention to stone, as an etiological factor. Uric acid infarcts are common in infancy. Given an infection of the bowel plus an injury by the presence of calculi, even if small, it is not difficult to account for the so-called coli infections, both of the bladder and kidney. Albumin and casts in early infancy are quite common.

Dr. Tuttle reported two cases; the first followed a circumcision, streptococci were found; in the second case which also followed a circumcision, large uric acid crystals were found. This patient developed pneumonia and for the time, the urinary trouble was forgotten. After recovery from the pneumonia, a recurrence of the urinary symptoms occurred.

Dr. Zahorsky, in closing, said that a large quantity of albumin during the first days, diminishing rapidly, speaks for cystitis. Specific gravity is usually low in infancy and is not of any help. One can get urine usually, by getting a child up out of sleep and holding it over a vessel. The urine should be examined in every acute fever in which a diagnosis is in doubt.

Dr. Zahorsky recited some recent experience in a medico-legal case in which he was asked to testify as an expert in pediatrics.

Several important questions were put to him in regard to the growth and physical condition of the infant. One was, how accurately the age of an infant could be determined by physical examination, without knowing the history of the infant. His reply was that during the first two weeks, the signs depended upon were, the condition of the cord and the "flush" of the newlyborn. As to the former, he stated that it sloughs off any time between the 3rd and 15th day, hence it would be pardonable to make an error of from 3 to 5 days in the age. The rubor neonatorum disappears any time between ten days and three weeks, certain irritants (as soap) may cause it to persist even longer, hence it is a very unreliable sign. The condition of the navel itself after the cord drops off, varies so much that an error of two or three weeks might easily be made.

After the first month, if nothing is known of the nutritive history of the infant, errors of two or three months, or even more must be allowed. The fontanelle is usually about the same size at six months as at birth. The closure of sutures occurs from six weeks to four months, usually two months.

The length of the baby, the condition of the cranial bones, fontanelles and sutures vary so much according to the rapidity of growth, that, the nutritive history being unknown, the estimation of the infant's age is very uncertain under one year of age.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

December 14, 1905.

Dr. D. E. LaFetra, presiding.

IDIOTIC CHILD WITH CRANIAL SYPHILIS.—This child, a boy of two and a half years, was presented by Dr. Welt-Kakels. He belonged to a large family, the other children of which were living and well. No history of syphilis in the parents could be obtained and the child had no skin eruption or snuffles. When two years old he had a discharge from his ear for a time, and also an abscess in the neck. He had no teeth until the end of his second year. He did not seem to know his parents, could not stand alone nor speak a word, had a stupid expression of face, and did not react to loud noises. He was usually good natured, but sometimes became excited and destructive. He ate ravenously, and thrust everything he could get hold of, no matter what, into his mouth. Shortly after the completion of his second year a swelling was noticed over his right eye, and some eight weeks later another on his left temple. They were not painful, and had resisted treatment. Physical examination showed a fairly well nourished child, 25 pounds in weight, skin and mucous membrane normal, and enlarged superficial lymph nodes. Pupils reacted to light, and there was a left-sided nystagmus. Eyelids and brows showed some loss of hair. The child dribbled from the mouth, his nose was slightly sunken at the bridge, his hard palate arched, and adenoids were present in the nasopharynx. He had all his teeth, some of them already decayed. The tumor over his right eye was as large as a half dollar, shaped like a watch crystal. He showed no pain upon pressure. The edge of the tumor was a hard ridge, but the center was elastic. The tumor over the left temporal region was of the same general character. A bloody fluid secured by puncture of the larger tumor and examined under the microscope showed very minute tissue threads, but no spirochetae pallidae could be detected, even by the most searching examination of both fresh and stained specimens.

A SUGAR OF MILK GRADUATE.—Dr. R. G. Freeman showed a graduate which provided a reasonably correct measurement for practical purposes.

SWALLOWING OF AN OPEN SAFETY PIN.—Dr. Hedges reported the case of a child six weeks old who swallowed an open safety pin which accidentally fell into its mouth. The child was kept under constant X-ray observation, which enabled the course of the safety pin to be accurately traced, and preparations were made to do a laparotomy at the first sign of trouble. Opinions were divided as to the advisability of operative interference at once, but this was not done, and the child continued well, with no indications of gastrointestinal disturbance. On the fifth day the pin was seen in the descending colon, hinge down, and the next day was passed in a mass of semi-solid fecal matter.

HYDROCEPHALUS AND RACHITIS TREATED BY RADIANT ENERGY.—A paper on this subject was read by Dr. Margaret Cleaves, who believed strongly in the capability of radiant energy to penetrate the cranial bones and act upon the effusion of fluid into the ventricles and upon the lining membrane which was often granular and thickened. A stimulus to the brain structure, tending to the furtherance of nutritive changes, could also be counted upon. The paper included report of two cases, one of congenital internal hydrocephalus and one which had been four times diagnosed as primary hydrocephalus and in which a rachitic element was recognized. In both good results were secured. Dr. Cleaves said that she did not claim that radiant energy was a panacea for hydrocephalus and rachitis, but wished to call attention to the results obtained and suggest further investigation along such lines.

Dr. Leslie Meacham said that he had seen the first patient after a week of treatment and again after six weeks, and the change was remarkable. At the first occasion the child was in an almost comatose state, and could be roused only with pronounced stimulus. At the end of the six weeks its intelligence was apparently normal.

Dr. L. G. Cole said that he saw the patient after treatment had gone on for some time and it seemed quite normal then.

Dr. M. Nicholl, Jr., said that he thought the second case might be simply one of rickets, and that although the light treatment probably had some effect it must not be forgotten that in such cases good food and care were a great aid.

Dr. La Fetra said that he thought the second case one of rachitis, but that the child seemed to improve more rapidly than was common in such cases, and this might be attributed to the light treatment.

Dr. Cleaves said that it was possible for a woman with an effusion in the pleural cavity sufficient to cause dyspnea, with the tappings showing evidence of new growth, to be relieved of the dyspnea from the first treatment, the fluid eventually disappearing entirely. It was reasonable to believe then that fluid in the cerebral ventricles could also be absorbed by the use of the light. She emphasized the importance of an early application of the treatment.

GONOCOCCUS VAGINITIS IN LITTLE GIRLS.—A paper on this subject was presented by Dr. W. D. Trenwith, who reported a series of twelve cases, limited to those which he had been able to follow to the end. More than half of these children were indirectly infected by the father, through the mother, and in some cases also through a sister. One acquired the disease in a day nursery. In treating these patients he used vaginal douches of a warm solution of potassium permanganate, 1-4000, applied by means of a soft rubber catheter connected by a medicine dropper with a fountain syringe at an elevation of about three feet. This treatment was carried out two or three times a day as the severity of the case demanded. The catheter should not be larger than No. 15, Fr., and if lubricated with glycerine or chondrus jelly and gentleness was used in introducing it into the vagina, no injury would result. When it met with obstruction no attempt should be made to introduce it further. When the discharge became slight in quantity and mucopurulent in character the potassium permanganate was discontinued and morning and evening douches of equal parts of zinc sulphate and alum, 30 grains to the pint, substituted. One great difficulty in the cure of these cases was to impress the mother with the importance of the treatment sufficiently so that she would not neglect it at home. When the discharge had become slight and the zinc and alum douche was being used at home, the physician used a solution of silver nitrate, 1-200, 1-100, 1-500, 1-250, 1-125, ʒi-℥ss injected into the vagina. This generally completed the cure. In two of his cases the urethra became involved. A ten per cent. solution of silver nitrate was applied directly to the urethra and a cure effected. The bowels were kept active and the diet regulated The mothers were taught the necessity of scrupulous cleanliness of the external genitals secured by frequent washing and dusting with talcum powder or boracic acid. The child should wear a gauze napkin which could be destroyed. The mothers were taught how to use the catheter, and were invariably told of the infectious nature of the disease. The time required to effect a cure varied. In primary infections where treatment was begun within a fortnight the average time was seven weeks. The average for the entire series, including two intractable cases, was four and a half months.

In closing, Dr. Trenwith laid stress upon the following points: 1. The great need for early diagnosis and treatment. 2. The necessity for frequent douching with large quantities of solution. 3. The non-use of absorbent cotton as a dressing for the parts. 4. The need for care and gentleness in the treatment. 5. That a case should not be considered cured until not only had the discharge stopped, but it was no longer possible to find the gonococcus by microscopical examination of the vaginal secretions. 6. The need of impressing the mother with the serious nature of the disease and the necessity for treatment until the gonococci had entirely disappeared. 7. The greater dissemination of knowledge among men and women who suffer from gonorrhea as to its infectiousness to others and its power to do at times great harm at a period remote from the time of primary infection, when the disease remains uncured. 8. The great necessity for care in keeping cases of gonorrhea vaginitis out of the day nurseries and babies' hospitals because of the epidemic character it assumed in such conditions.

Dr. Welt-Kakels thought that most girls with gonococcus vaginitis contracted it from their mothers. She mentioned the fact that children were sometimes sent home from a hospital with a specific vaginitis without the mother being told of the nature of the trouble and in this way other children in the family were exposed to infection. She thought Dr. Trenwith had been fortunate in the quickness of his cures. She used the same method as he did but a stronger silver solution by means of a fountain syringe.

Dr. Henry Heiman said that he preferred to use Ultzman's posterior urethral syringe and had never seen any bad results from using it. He also employed the stronger solutions. He had found vaginitis epidemic in nearly every hospital in the city and the only way to get rid of it was by the same rigid quarantine which would be used in scarlet fever or diphtheria.

Dr. G. R. Pisek advocated packing the vagina rather than douches and irrigations.

Dr. G. D. Scott favored stronger solutions of argyrol or protargol.

Dr. LaFetra said that fully nine-tenths of the cases of vaginitis in children were gonorrheal.

Dr. Trenwith, in closing the discussion, said that persons attending such cases were too little careful in the care of their hands.

EDITORIAL

A STITCH IN TIME.

In spite of resentful defenders of what they consider individual liberty in the concrete, and in spite of apprehensive deprecators of socialistic tendencies in the abstract, the medical supervision of school children by school physicians under the health authorities of the community continues to find effective advocates.

Dr. John J. Cronin, of the New York Health Department, has recently expressed his views upon the subject and quotes statistics which demonstrate the need of such supervision. He finds that sixty per cent. of school children are defective to a greater or less degree, and that of the large number of backward, incorrigible and truant children discovered in the schools, 90 per cent. were found physically imperfect as regards their eyes, nose, ears, throat, nutrition, locomotive apparatus and other general bodily functions.

Dr. Cronin recognizes the large expenditure necessary to maintain this supervision as he would have it, but points out that it is nevertheless a good investment for the community, returning interest in the lowered mortality and in the reduction of expense for contagious hospitals, fumigations, etc. Some idea of the scope of the work can be gathered from the statement that the examination of school children as now conducted considers the nutrition of child, presence or absence of enlarged glands, nervous diseases, cardiac, and pulmonary disease, skin disease, defect of the locomotive apparatus, defective vision, hearing, teeth, palate, hypertrophied tonsils, adenoid growths of naso-pharynx, mentality, and particularly does it require whether treatment is considered necessary or not.

A summarized report of examinations made from March 27, 1905, to December 31, 1905, inclusive, is as follows:

Bad nutrition	3,283
Enlarged anterior glands	14,214
Enlarged posterior glands	3,047
Chorea	738

Cardiac disease	895
Pulmonary disease	600
Skin disease	989
Deformity of spine	485
Deformity of chest	401
Deformity of extremities	498
Defective vision (objective)	16,394
Defective vision (subjective)	
Defective hearing	1,296
Defective nasal breathing	6,182
Defective teeth	18,182
Defective palate	698
Hypertrophied tonsil	8,347
Posterior nasal growths	5,119
Bad mentality	1,210
Requiring medical attention	33,551
Examined	55,332

Dr. Cronin justly points out that the main object is not so much the relief of the immediate condition discovered in the defective child as it is the enabling him to secure an education with as little handicap as possible, to provide as nearly perfect as may be an adjustment of his environment and his mental and physical needs, to the end that his development may be complete.

To put the child "in a proper condition for study and the ready absorption of knowledge" is of more importance than the relief of the physical discomfort per se. Education, the effective training of the intelligence, the author believes to be the solution of practically all problems, a view easily concurred with by those whose work has brought them in contact with large numbers of persons, of whatever class, and who have noted the grateful relief experienced when an educated intelligence grasps the idea and applies it, after days of patient struggling with the untrained.

Throughout his discussion, Dr. Cronin evidently has in mind the spirit of the time honored aphorism, "A stitch in time saves nine," and his contention that incalculable good may be accomplished by checking at the beginning those conditions which lead to disease and which if neglected inevitably produce consequences of disaster that increase by geometrical progression. It may be that enlarged cervical glands existing in the absence of any appreciable local trouble indicate a weakened bodily resistance to the onslaughts of tuberculosis. It may be that a poorly nourished child, forced to the limit of its strength to keep up with its studies loses proper control of co-ordination and develops chorea. It may be that cardiac disease renders the child unfit for the athletic sports so freely indulged in nowadays and dictates a sort of training which will secure enough practical knowledge for him to earn his living with his brains rather than his hands. It may be that a child with a chronic cough at school is found to come from a home where tuberculosis exists, hitherto unreported. In fact, actual cases of tuberculosis have been found in children themselves, and in the past they have not been excluded from attendance except on special complaint. That this may be changed in the near future is to be hoped. As the author justly remarks: "They will never require much education if the present mode of existence is persisted in, as the expectancy of their life is very limited; whereas, if they are now compelled by the city to be segregated in some institution under the supervision of the city, and there receive practical education and sanatorium treatment of their disease, it will prevent possibility of contagion to other school children and their hygienic education will be of great help to the community."

Skin diseases of various sorts, including those of parasitic origin, have been among the most obviously troublesome in the past, but it is a significant testimony to the value of the new regime that with improvement in the general nutrition of the child, and, of course, the local treatment of parasites, the skin diseases clear up. Again, it may be that faulty desks or other remediable conditions create or foster orthopedic deformities, or from other reasons slight deformities exist which can be corrected with proper calisthenics. Defective sight and hearing, however, claim perhaps the largest share of the handicapped children. As 33 1-3 per cent. of the school children have defective vision and four per cent. defective hearing, we have at once more than a third of the entire number physically unfit to pursue their studies with the same mechanical advantages as the others.

The more remote but no less direct effects of these disabilities are graphically set forth by Dr. Cronin:

"Is it any wonder that teachers and school children are nervous wrecks after years of class attendance when thirty-three and one-third per cent. of the children have not been able to see properly? Others in the class progress and advance easily; only by the greatest energy do the defective progress. After a time a limit is reached in their ability to keep up; the strain is too great; then diffidence possesses them; their pride dissatisfies them; and this restive dissatisfied feeling eventuates in truancy or desire to leave school and even the establishment of bad habits. How many bad habits exist in the leaders of any class? I dare say, not any. But the poor defective who cannot look at a book ten minutes in succession without headache or nervous flushing going up and down the spine—is it any wonder that he relaxes? To think that these conditions have existed for so long a time without a remedy being applied is, to say the least, not complimentary to the authorities; while it is doubtful if they have improved (?) their curriculum, they have succeeded in adding more to an already overtaxed class of pupils, resulting in earlier dissatisfaction with studies, earlier leaving of school, and in the interim, plenty of truancy. Now truancy is the first stigma of criminality or mental depravity. Association of these truants results in the origin of social evils. Anything that is free, and wild, and lawless is readily appropriated by this class, as badness seems to be absorbed spontaneously, so that shortly social calamities obtain, prisons are filled, insane asylums crowded, sanitariums surcharged.

"Supposing the condition is not quite as bad—that it is simply a question of a child of proper environment who finds that she cannot equal her own desires in keeping up with the class in studies. She leaves school, enters a factory or store. Anybody who knows anything about the conditions existing in these places of employment realizes that they would not allow the members of their own family to enter them for the purpose of improving their rectitude or intellectuality. Those who are defective are as irresponsible in these places as in others. We all understand that just as noble people work in these places as in any other, but these persons are not defectives in any respect. It is as hard, in my opinion, for a truly healthy body to do or think wrong as it is difficult for a defective body to do or think right. In mechanics, an apparatus that is perfect has to go smoothly and right; if imperfect it never gets nearer to the right path than to cross it in its crazy gyration. 'Man is responsible for the good he does—for the evil, the pathological deviations of his organism.' (Mafucci)."

Dr. Cronin believes that the city should furnish eye glasses and adequate means of treatment as it does books, and sees in such a movement no danger of "pauperizing" them. On the contrary, he believes that the lifting of the burden from the thousands of defective children of this generation will materially lessen the number of paupers in the next.

ABSTRACTS

Infectious Erythema.—J. FLEISCHER (Wien. Med. Woch., Oct. 14, p. 2023). Recently cases have repeatedly been described, which, though more or less resembling German measles, were examples of a distinct disease, called by Escherich and others "infectious erythema" and by Plachte (Review, 1904, p. 223) "megalerythema epidemicum." The disease always occurs in epidemics, and usually synchronizes with an outbreak of measles or German measles. Children between 4 and 12 are chiefly attacked. The general health is usually but slightly, if at all, disturbed, and the rash may be the only symptom. The eruption first appears on the face as intense diffuse redness and swelling of the cheeks, which vividly contrasts with the whiteness of the nasolabial furrows, the oral region, and the chin. More rarely there are definite spots or circles on the cheeks and large bluish-red patches on the forehead and round the ears, which resemble those which afterwards appear on the limbs. The eruption chiefly affects the limbs, where it persists for 6 to 12 days, and the trunk may be completely spared. The incubation period is from 6 to 14 days. The disease is only moderately infectious and children may return to school as soon as the eruption on the face has faded. The writer reports an outbreak in a family of nine children.

On May 9 (most reported epidemics have occurred in April or May), a girl, aged 7, had an eruption. The cheeks were red and swollen. On the limbs were numerous bright red and bluish-red slightly elevated spots, in places confluent. The trunk was exempt except for a few spots on the abdomen. The temperature was 100.8° and the pulse 90. The conjunctivæ were not injected and there was no coryza. The pharnyx and internal organs were normal. There was no albuminuria. In 24 hours the temperature became normal, and the eruption began to fade. Five days later only fine branny desquamation of the face remained. The child was not isolated.

At intervals varying between 8 and 14 days the whole family of 9 children, aged from 2 to 16 years, were similarly attacked. In some the trunk was affected equally with the limbs and in 2 the appearance of the face was not typical. In 2 children, after apparent recovery for respectively 6 and 10 days, a relapse occurred and ran a course similar to that of the first attack. In no case was there albuminuria, enlargement of lymphatic glands, or catarrhal symptoms. All the children, except the youngest, had had the measles or German measles. In the latter disease the eruption affects the face and limbs equally, and has the same character in both; there are also usually some slight catarrhal symptoms and enlargement of the lymphatic glands behind the sterno-mastoid. None of the children had had scarlet fever. Moreover this was excluded by the absence of pharyngitis, of desquamation of the hands and soles, and of other complications. The writer could not trace any other cases in the neighborhood and the girl first affected was not attending school.

The Albuminuria of Adolescents.—Dukes (British Med. Journ., October 7th, 1905). The writer, who has had a unique experience of this functional derangement, which is so prevalent during adolescence, has come to some definite conclusions which are of the utmost importance to the welfare of those who are affected thereby.

While formerly believing that this unstable albuminuria during adolescence was frequently the precursor of organic disease of the kidneys, extended experience has convinced him that it is merely a vasometer disturbance, and that the sufferers invariably recover at, or before, the attainment of manhood or womanhood. He points out the various types of constitution in which the ailment arises—in those in whom there is increased arterial tension, in those where the arterial tension is diminished, and in neurotics. He further indicates the appropriate treatment in each type of individual, especially pointing out that their education and their games should not be interfered with. In his opinion it arises from a want of adjustment of the cardio-vascular system to changes of blood-pressure. The albumen, therefore, mostly occurs when there is any special stress upon the circulation, as in assuming the vertical position, during active exertion, and after meals.

It is a paper that merits careful consideration on account of the unrivalled opportunities for its study which the author has availed himself of for so many years.

Cellulitis of the Lateral Pharnygeal Wall. Ulceration into the External Carotid Artery.—Broca (Journal des Praticiens, Aug. 26, 1905). The case was an infant, 13 months old, admitted with acute glandular enlargement on the right side of the neck. There was distinct obstruction to respiration, and on further examination the right side of the pharynx behind the tonsil was found to be soft and prominent. Incision by the pharyngeal route through the mouth was considered too dangerous. A free incision was made along the anterior border of the right sterno-mastoid and the abscess sought for and opened by Hilton's method. The case ultimately did very well, but at the time a guarded prognosis was given owing to the possibility of ulceration into the right carotid trunk. This formidable complication has been seen in several of these cases. Treatment must always be a matter of difficulty. If time permits, the best method would appear to be a free incision along the sterno-mastoid, with an attempt to secure the bleeding vessel. Broca recounts one of his cases in which this method met with complete success.

Adenoid Vegetations in Infants.—Moure (Journal de Medicine de Bordeaux, Aug. 27th, 1905). The author believes that adenoids are much more common in quite young infants than is generally supposed. At this age the existence of respiratory obstruction affords the only definite sign. The respiratory trouble leads to "croaking" noises, and is much accentuated in wet weather. Moure believes that these cases are frequently overlooked or diagnosed as coryza. It is important to deal with these adenoids, since they may lead to any of the complications, mechanical or septic, associated with adenoids in later life. Owing to the size of the adenoid mass and the danger of its obstructing the air passages when cut adrift, a special curette with a "cage" attachment is used. Operation has been carried out as early as the twentieth day of life.

The Etherization of Children.—Elmer (Archives of Pediatrics, 1905, p. 454, et seq.). The writer believes that ether is the safest and best anesthetic for young subjects. There are few occasions on which ether cannot be given in preference to other anesthetics. Abnormal conditions of the pulmonary system supply the chief contra-indications to the use of ether. The open method of administration should always be adopted. In order to lessen shock and preserve bodily vitality and heat an ample supply of oxygen is essential, and the lack of the supply is an objection to the various forms of apparatus based on the Clover model. The inhaler recommended is the one by Allis.

The Management of Hernia in Infancy and Childhood, with Results of Operative Treatment.—Coley (Jour. of the Amer. Med. Association, January, 1905). One-third of all cases of hernia occur in children under the age of 14 years. Probably the great majority of herniæ in children under the age of five or six years are concerned with a sac preformed and extending to the testis, or involving only the funicular process.

Coley believes it is a good rule not to operate until the age of four years (relying on the truss), except (1) there is a history of strangulation that has become reduced by taxis; (2) where, despite carefully directed truss treatment, the hernia has become irreducible, or reducible with difficulty; (3) where the rupture cannot be controlled by a truss, and is gradually increasing in size; (4) in all cases of femoral hernia; (5) in all cases of hernia associated with reducible hydrocele or fluid in the hernial sac. The author thinks that in children under four years hernia can be cured by carefully directed truss treatment, although it is probable that in after years a considerable percentage will relapse. Beyond the age of four years in a fair proportion of cases a cure can be effected by means of a truss. Coley considers the "opposite-side" or "cross--body" truss the best.

Pyloric Stenosis in Infancy; Report of a Case; Gastro-enterostomy; Recovery.—Shaw and Elting (Albany Med. Annals, 1905, p. 19). The case was that of a female child, aged eleven months, the second child of Russian Jew parents, whose other child was thirteen months older, and was quite healthy. Vomiting is supposed to have begun in the fifth or sixth month. The child was breast-fed. At the age of ten months she had broncho-pneumonia, followed by empyema, which was aspirated three weeks before admission to hospital. Vomiting was the prominent feature of the case at this time, and persisted in spite of lavage (twice daily) for three weeks. The stomach was dilated to level of umbilicus, but at no time was a pyloric tumor made out. Loss of weight was very marked. Medical measures failing to give relief, operation was performed under ether narcosis (the child being about 18 months old), and through a median incision, 8 c.m. long, anterior gastro-jejunostomy (Kocher) was done in about 45 minutes. The child improved steadily, and after four weeks vomiting occurred only occasionally. Recovery was complete in a few months.

The authors give a brief account of the pathogenesis of this condition, and after discussing the treatment come to the following conclusions:—(1) Pyloric stenosis in the infant is of much more frequent occurrence than is commonly supposed; (2) medical treatment of these cases has proved uncertain and unsatisfactory; (3) surgical intereference should be practiced before the strength and vitality of the patients have become seriously reduced; (4) pyloroplasty and anterior gastro-jejunostomy are the operations of choice.

Prognosis of Pneumonia in Infants.—E. Terrien (La Presse Méd., May 20) calls attention to the fact that although the prognosis of pneumonia in infants is usually good, there are several forms of sudden death to be feared. Some of these result from complications, especially purulent pleurisy, and pericarditis. One of the author's cases died suddenly when there was only involvement of the upper lobe of one lung, without any complications and in a previously healthy child of ten. At the autopsy nothing was found but an acute dilatation of the heart. There may be several forms of extrapulmonary infection in pneumonia, as has been shown by bacteriological examinations post mortem. The localization of the process depends on the receptivity of the individual and the resistance of the soil to the bacteria. This resistance varies in different animals, as well as with the age of the animal. Man is very resistant, but infants are less so. Cyanosis is often the only sign of trouble, coming but a short time before a sudden exit. This cyanosis may be a sign of latent pericarditis, which is particularly dangerous.

Pneumococcus in Broncho-Pneumonia of Infants.—WALLSTEIN (Journal of Experimental Medicine, 1905, p. 390). The pneumococcus was demonstrated in 67 of the 100 cases of broncho-pneumonia examined. The 67 cases consisted of 25 primary and 42 secondary pneumonias. In 42 per cent. of the primary cases the pneumococcus was present in pure culture, but in the secondary cases it was found alone in 15 per cent. only. Pleurisy was present in 51 per cent. of the 67 cases. The lesion was an acute fibrinous exudate in 22 instances, an acute purulent exudate in 4 instances, and a fibrino-purulent one in 8 instances. The cases from which the pneumococcus was absent showed pleurisy in one-third of the number, so that the pneumococcus cases showed a decidedly larger number of examples of pleurisy than did those of other organisms. Purulent infiltrations of the lungs occurred in 7 cases, and all these contained the pneumococcus, either alone or combined with the streptococcus, or the staphylococcus pyogenes aureus. Of the 100 cases, 45 were coalescent, and therefore "pseudo-lobar" in distribution, with the pneumococcus present in 73 per cent. In the focalised cases the pneumococcus was only present in 56 per cent. of the cases.

Lobar Pneumonia in Children.—G. A. SUTHERLAND (Clinical Journal, London). The author states, in the treatment of lobar pneumonia in children, that the greater number of cases if put to bed, with fresh air and suitable diet, will generally recover. These cases, however, although the natural course of the disease can not be shortened, must be carefully observed, in order to relieve any troublesome symptoms which are liable to arise in the course of the disease, and to meet complications which are not unlikely to occur. Among these symptoms is pleuritic pain, which causes the child a great deal of suffering, and in the treatment of this symptom he recommends the application of a turpentine fomentation or a linseed poultice over the painful area for half an hour or until the skin is throughly reddened. This may be repeated some hours later, but it should not be kept on the chest continuously, irrespective of the presence of this symptom. He especially emphasizes, therefore, the value of these hot moist applications if used interruptedly.

In the diaphragmatic form of pleurisy two or three leeches may be applied over the affected area in combination with strapping of the affected side. When such treatment fails he recommends as a last resort the use of opium and morphine.

In this connection he dwells on the contraindication of opium in pneumonia, because of its toxic effect on the respiratory center, and states that it should not be given except in extreme circumstances. Coughing is another symptom which is very disturbing to the patient, due in part, perhaps, to the irritation of the exudate which is present, or to the presence of a bronchitis. In either case the interrupted use of hot local applications as described above, is of value.

He speaks also of the position of the patient in bed as being a cause in producing these paroxysms of coughing, and recommends that the position of the child be changed from time to time. If necessary the use of steam inhalations may be resorted to in irritable conditions of the bronchi. It may be used for from ten to fifteen minutes at a time, and repeated at intervals of every four or five hours. When there is persistent coughing, with or without much secretion, he recommends the tincture of belladonna in doses of from 5 to 10 minims (.30-.65), repeated as the individual case requires. It is especially recommended when the secretion is in excess, as it dulls the sensory branches of the vagus throughout the lungs, and stimulates the respiratory centers. In some cases from 5 to 10 minims (.30-.65) of tincture opii camphorata will relieve the hacking cough present.

Pyrexia is another condition in the course of pneumonia which sometimes must be combated, but it must be remembered that the height of the temperature is not necessarily an indication of the gravity of the disease, but prolonged high temperature after the seventh day tends rapidly to weaken the patient and must be carefully watched. The author deprecates the use of antipyretic drugs in the reduction of the temperature of pneumonia. In infants the employment of a hot bath, which may be rapidly cooled to 85° F., will frequently cause a drop in the temperature of from one to two degrees, and at the same time will relieve the restlessness of the patient. In older children he recommends sponging in bed with hot or tepid water, and in extreme nervous disturbances the temporary application of cold cloths or the icebag to the head. He also recommends the internal use of liquor ammonia acetatis in dram doses (4.00) as an antipyretic. This rise in temperature, however, may not be due to the toxic effect of the pneumococcus alone, but may be caused by gastrointestinal disturbances, and consequently calomel in small doses may relieve the hyperpyrexia, and the restlessness.

In the treatment of insomnia in these cases he recommends cold applications to the head or hot applications to the chest. The use of amonium bromide in from 5- to 10-grain doses (.30-.65) is recommended as effective and as the least harmful of all the hypnotics. In some cases a dose of brandy, drams 2 to 4 (8.00-15.00) in hot water is recommended as a very efficient hypnotic.

Any sign of cardiac weakness must be carefully watched for, such as dilatation of the left ventricle or failure of the right heart, and at the onset of these signs he recommends the use of alcohol in the form of brandy or wine, strychnia and ether. For an infant one year old in the precritical stage of pneumonia he recommends strychnia in doses of from 1-100 grain to 1-200 grain (.0006-.0003) every four hours. If dilatation of the right ventricle is present, with cyanosis and dyspnea, showing an over action of the right side of the heart, some depletion of blood is recommended. He therefore recommends the application of three or four leeches over the hepatic region, followed by a hot fomentation to encourage further bleeding. In connection with this treatment he advises further assistance by a two- or three-grain dose of calomel, followed by a saline, in addition to the heart stimulants already recommended. Dry cupping is sometimes advised, employed over the base of the lungs posteriorly, as a substitute for the leeches.

He has not seen much benefit from the use of oxygen inhalations.

In some cases dyspnea and rapid breathing arise, which apparently do not depend on the pulmonary or cardiac condition. In such cases the cause is probably the failure of the respiratory centers, due to the effects of the toxemia, and in these instances he recommends atropin as a direct respiratory stimulent, combined with strychnia, given in doses of from 1-100 to 1-200 grain (.0006-.0003) hypodermically every four hours for a child 5 years of age.

Laryngismus Stridulus.—Comby (Medical Bulletin) recommends that in these sudden paroxysms hot compresses be applied to the anterior portion of the neck, and that an emetic be given internally. The child, of course, should be confined to the house, and given hot drinks with antispasmodic remedies. The following combination is recommended in such conditions:

℞.	Tinct. belladonna ....m. xx	1	30
	Potassi bromidi .... gr. xxx	2	
	Syrupi aurantii corticis q. s. ad.......oz. i	30	

M. Sig.: One teaspoonful every three hours in a little water.

In severe cases the dose of the bromid may be increased. The following combination is sometimes recommended as a substitute for the foregoing:

℞.	Spiritus chloroformi	m. x		65
	Glycerini	dr. i	4	
	Syrupi tolutani	dr. v	20	
	Aqua dest. q. s. ad.	oz. ii	60	

M. Sig.: One teaspoonful at a dose, and repeat every half-hour if necessary.

In some cases in which asphyxia may be probable, rhythmic traction of the tongue is recommended previous to intubation or tracheotomy. He recommends as prophylactic treatment of this trouble that any vegetative growths in the nasopharynx should be removed as well as large faucial tonsils, if present.

Mercury in Parasypilitic Conditions.—In the treatment of certain stages of syphilis and in those diseases due to the toxins of this disease, as tabes dorsalis, Dr. Frank Billings recommends mercury given in the usual form, as inunctions, by the application of the ointment to different portions of the body each day, preferably the inner portions of the thighs, the calves of the legs, the sides of the thorax, and the inner portion of the arms. He also recommends as a substitute for this method of introducing mercury into the system, the injections of the bichlorid of mercury deeply into the muscular tissue, about two or three times a week. The dose of the bichlorid recommended is about 1-25 of a grain (.0025). He especially recommends as probably the most suitable preparation of mercury in the treatment of these parasyphilitic conditions the salicylate administered in the following combination:

℞.	Hydrargyri salicylatis	gr. xxiv	1	65
	Liquid paraffin	oz. ss	15	

M. Sig.: Five minims injected subcutaneously two or three times a week.

The advantage of this latter form of medication is that it is taken up very gradually by the system, and consequently the effects of the mercury are present for a number of weeks or months after these injections have been made, owing to this slow absorption. The size of the dose may be gradually increased, if necessary, to meet the requirements of the case. The iodids are recommended in conjunction with this treatment, and are to be given in gradually increasing doses by the mouth.

The Treatment of Laryngeal Manifestations of Influenza.—E. J. MOURE, in an abstract in Merck's Archives, states that the laryngeal manifestations of influenza may be described under four different forms—the catarrhal form, the infiltrated edematous form, the ulcerative form, and the myopathic form. As local treatment in these different conditions he recommends an inhalation of the following combination:

℞.	Menthol	gr. x		65
	Balsam peruviani	dr. ss	2	
	Thymol	gr. i		06
	Tinct. eucalypti q. s. ad.	oz. ii	60	

M. Sig.: One teaspoonful floated on a pint of hot water as an inhalation

In conjunction with this treatment he recommends hot fomentations externally applied to the neck and throat, as especially useful in painful congestive forms. Scarification, according to the author, may be necessary in the edematous form, when the following combination fails to give the proper relief:

℞.	Cocaine hydrochlor	gr. ii-iiiss		12-.20
	Sol. adrenalin (1-1,000)	m. xl	2	65
	Glycerini			
	Aq. menth. pip., aa	dr. vi	24	
	Aqua q. s. ad.	oz. vi	180	

M. Sig.: To be used as a spray three or four times a day.

Later in the course of the disease, after the infiltration has subsided, he recommends applications of a silver nitrate or zinc chloride solution, 1 to 100, locally to the affected parts.

Ethyl Chlorid Anesthesia for Infants.—MURRAY (Lancet, Mar. 29, 1905). Murray regards ethyl chlorid as one of the best means of producing anesthesia of from five to fifteen minutes duration in infants and older children. She has administered ethyl chlorid to 150 infants under a year old. The youngest patients were five and fourteen days old respectively, and a large proportion of them were from five to seven weeks old. Many of them had not undergone any preparation at all, and the only precaution taken with regard to the others had been to withhold food for some hours that morning. The use of ethyl chlorid in prolonged operations is not recommended, partly owing to the waste of the drug by evaporation, and partly because it has no special advantage over chloroform and the A. C. E. mixture when a narcosis of from twenty to forty minutes is required. Murray has found ethyl chlorid very suitable for tenotomy, circumcision, empyema, and the removal of adenoids, cysts, polypi, dermoids and nevi. Murray says that the simplest form of inhaler is the best to use; a useful one consists of an ordinary shaft on to which the face-piece and bag fit; the free end is closed by a stopper attached by means of a fine chain and the anesthetic is sprayed through this opening. To the end of the shaft which enters the bag two curved wires are fitted, so adjusted as to make a little cage in which a small sponge is placed. When ethyl chlorid is sprayed into a bag of the usual size, part of it vaporizes and the other part tends to fall to the bottom and to vaporize as the patient breathes in and out. A young infant does not make a sufficient respiratory effort to produce the necessary amount of vaporization and for this reason induction is often unduly delayed and the anesthesia is not smoothly maintained. The sponge inside the bag intercepts the anesthetic and by holding it nearer to the child obviates these defects, making it possible for the patient to inhale it more rapidly and without effort. The same result is obtained if a bag of about half the usual size is employed, but it is not always convenient to change the bag between the cases. A celluloid face-piece is generally preferable since it not only permits the anesthetist to observe the patient more readily, but also resists the action of the vapor better than rubber. For infants of a few days or a few weeks old, Murray commences by spraying 3 c.c. into the inhaler; for those of six months and upward she gives 5 c.c. at once. The mask is then approached to the face but not pressed against it, so that the baby has several breaths of air and vapor mixed; it is then more closely applied so as to exclude all air except that which is already in the bag, and in a few seconds the child becomes unconscious. When one is sure that the anesthesia is deep, and the surgeon has made his incision or begun the operation, the mask should be removed from the face and a few breaths of air should be given. If it is desired to continue the period of narcosis for some time the mask should not be kept off for very long, but only raised occasionally for air. If the respiration indicates the lightening of the narcosis a few more cubic centimeters may be added to the bag; on these lines the anesthesia may be prolonged indefinitely.

Treatment of Infantile Constipation.—BURNET (Medical Bulletin, November, 1905). When dietetic measures fail, resort may be had to drugs. In acute cases calomel in small and repeated doses, followed in due time by castor-oil, is the treatment which seems to answer every indication, increasing the intestinal secretion, removing all offending materials, and restoring the bowel to its normal condition. To hasten the results in temporary constipation, enemata may be employed, since they quickly unload that part of the intestine in which fecal matter is apt to lodge, and, exciting peristalsis, quickly aid the expulsion of what fecal matter there may be above. Soap and water, glycerine and water, or salt and water, are all good enemata. The long-continued use of enemata has a relaxing influence upon the bowel, and must not be indulged in to excess. Suppositories may be employed in the place of enemata, and of these glycerine, or one containing nux vomica and hyoscyamus, may be given at bedtime. The use of the ordinary purgatives is not to be encouraged, since they are liable to irritate the bowel, causing a catarrhal condition. The intestine becomes accustomed to their action, and it is necessary from time to time to increase the dose.

Fat Indigestion in Infants.—LOWENBURG (Medical Bulletin, November, 1905). The author states that an excess of fat may not infrequently be a source of indigestion. These infants vomit from half an hour to an hour after feeding. The vomited material is sour, and has an odor of butyric acid. Diarrhea is a frequent symptom; although contrary to the prevailing opinion, constipation is not an uncommon feature. The stools are greasy, and respond to the osmic acid test for fat, and oil globules are seen with the microscope. The fat may appear in the stools as lumps not unlike those of casein. The stools are sour and usually acid in reaction. A progressive loss in weight is sooner or later associated with this condition, as in proteid indigestion. Fat indigestion is best prevented by starting the infant on low fat percentages, say 1 per cent. The increase should be gradual, and never reach above 4 per cent. It is advisable never to exceed 4 per cent. in the majority of such cases. In the active management of such a case a calomel purge should be administered if vomiting is a permanent feature. The fat should be at once reduced to less than 1 per cent., and then only gradually and carefuly increased, the stools and the condition of the stomach being carefully watched.

The Treatment of Disorders Associated with Primary Dentition.—GUTHRIE (London Practitioner, October, 1905).—General preventive treatment consists in scrupulous attention to form and mode of preparation of diet. If the child's food is unwholesome, its alimentary tract will be unhealthy.

When sour milk in unclean bottles has set up diarrhea and colic, the best remedy is castor oil in emulsion with a little tincture of rhubarb:

℞ Olei ricini, m. x.;
Tinct. rhei, m. v;
Glycerini, m. v;
Tragacanthæ, gr. ½;
Aquæ menth. pip., q. s. ad f℥j.

To this may be added tr. opii in doses of one or two minims, if pain is extreme. The prejudice against giving laudanum to infants is groundless, except perhaps in those under the age of dentition. There is little danger in giving it even to these, provided that the dose be not too large, and that it be not repeated until drowsiness produced by it has passed off.

Salol may be added to the mixture when motions are peculiarly offensive, and bromide of potassium when restlessness and sleeplessness are pronounced.

Protracted Remissions in Tuberculous Meningitis of Children.—G. CARRIERE and L'HOTE (Revue de Med., No. 7, 1905).—In their discussion of the *course* of tuberculous meningitis and also the *diagnosis,* which can be made much more positive since the introduction of lumbar puncture, the authors state that the disease can no longer be considered as absolutely fatal. They mention recoveries, and bring three personal observations on children between four and seven years of age, who presented more or less protracted remissions, of 4½, 5 and 9 months respectively. The onset of this intermittent meningitis does not differ in any particular from the other forms. During the quiescent stage, certain manifestations on the part of the pulse, temperature, psychical condition, and nervous system point to an incomplete arrest of the trouble. The lumbar fluid still contains an increased number of leucocytes. The last lethal period is characterized by an abrupt onset and a very rapid course. The anatomical explanation of these remissions consists in the primarily localized disease of the meninges, which may undergo fibrous change, as was demonstated in the post-mortem examination of one of the cases. However, a new crop of tubercles in the vicinity constituted a permanent danger. During the remission of the pathological manifestations, energetic therapeutic measures are indicated in shape of general hygiene as well as internal medication with calomel, potassium iodide, and creosote, the latter being best given by the rectum.

The So-Called Physiological Cough of Infants.—VICTOR THEVENET (Lyon Méd.) has investigated the cough which often occurs in healthy infants immediately after feeding He finds that it is of much more frequent occurence with suckling than with artificial feeding. It is practically unknown in créches. It is a reflex but not a convulsive phenomenon. It is observed as a rule in well-nourished, healthy-looking infants who are steadily gaining weight. From inquiries made from mothers and nurses, it would seem to occur first on the second or third day after birth and to last for twelve months. It is more frequent after the first feeding of the day than after the later ones. In children who are partly breast-fed and partly bottle--fed, it often happens that the cough comes on after the breast and not after the bottle. The cough is associated in many cases with regurgitation of the milk or with actual vomiting of casein; it is found here as a rule, that the cough succeeds the regurgitation or vomiting and is a sign that these have stopped until after the next meal. In a child who has suffered from the reflex cough, any serious digestive disturbances or general illness causing malaise or loss of weight is associated with cessation of the cough. An improvement in health is often heralded by the return of the cough. Thévenet concludes that the cough should be regarded as a sign of relative surcharge of the stomach. It may be looked upon as a favorable indication but this indication is only a relative one. Its precise significance is the same, only less in degree, as that of the regurgitation which is equally often observed in infants who look quite healthy, but whose feeding is really too abundant or ill-regulated. It indicates that the alimentation is at least sufficient, and that the limit of digestive capacity has been attained. The explanation of the cough is that it is probably an abortive regurgitation, indicating that the stomach will no longer empty itself by the cardiac opening, but has decided on pyloric evacuation; of this the cough is probably not only the signal, but also an auxiliary..

The Nervous Manifestations of Acute Rheumatism.—Poynton and Paine (Lancet, Dec. 16, p. 1760). 1. The Etiology of Acute Rheumatism.—Five years ago the writers claimed that they had proved that a diplococcus was the cause of acute rheumatism, a cause that had been hazarded by others. Two years later they showed that rheumatic fever might be a cause of malignant as well as of so-called simple endocarditis. Since then they have been gradually filling up the gaps in the knowledge of the subject. They have isolated the diplococcus and demonstrated it in human and animal tissues damaged by rheumatism. It is never easy to find and very difficult to discover in the blood and arthritic effusions. It multiplies in the local lesions and the blood stream is only a channel of conduction, rheumatic septicemia being rare. The diplococci are difficult to find in the arthritic effusion, because they are deposited in the areolar tissue below the synovial membrane; and because the cells lining the synovial cavity are phagocytic. Moreover, numerous leucocytes escape into the synovial cavity and effusion, and aid in the destruction of the diplococci. Perhaps the effusion is due to toxins formed in the synovial tissue. In this connection the effusion produced by antitoxic sera is of interest. In a fatal case of rheumatic fever, Dr. Beattie found the effusion sterile, while the congested areas of synovial membrane gave a pure growth of the diplococcus. Acute rheumatism may be classed with the infective processes produced by the staphylococcus, streptococcus, pneumococcus, and gonococcus.

2. Chorea.—In 1901 the writers suggested that rheumatic chorea was due to the diplococcus infection. Possibly other infections may produce it. Evidence of the presence of a diplococcus in the nervous system is accumulating. In 1882 Westphal, Wessermann and Malkoff published the case of a child, dead from rheumatic pericarditis and chorea, from whose pericardial and cerebro-spinal fluids was isolated a diplococcus which produced arthritis in rabbits. They maintained that this diplococcus was the cause of acute articular rheumatism. In 1900 the present writers described choreiform movements in a rabbit as a result of an intravenous inoculation of the diplococcus, and in 1901 they found a diplococcus in the cerebro-spinal fluid of a child who had died from severe rheumatism with chorea. In the following case they isolated the diplococcus from the cerebro-spinal fluid, and on inoculating a rabbit with it produced arthritis, endocarditis, and pericarditis. A boy, aged 9, was admitted to hospital suffering from a second attack of acute rheumatism on Nov. 22, 1904. He had been ill for 7 weeks with sore-throat, multiple arthritis and general chorea, and he lived only 2 days in the hospital, dying with general pericarditis and violent chorea. The necropsy showed the pericardium bound down by recent and old adhesions but no endocarditis. The liver and kidneys were engorged, there was pleurisy with fibrino-plastic exudation, and the brain was hyperemic.

What is the pathology of rheumatic chorea? The lesions in rheumatic fever are of the pyemic type—local infections of various organs. Also there is a variable amount of general systemic poisoning as evidenced by the rapid anemia. Chorea may be a result of local lesions comparable to other local rheumatic lesions, or the delicate nervous tissues may be exceptionally sensitive to the general rheumatic poisoning. The writers incline to the view that chorea is a result of numerous lesions. This is a slight modification of the original views of Hughlings Jackson. They do not suppose that there is actual embolism, but rather small focal lesions external to the blood capillaries caused by the escape of the diplococci which are driven by the blood stream into these positions. The local changes around the capillaries might cause hemorrhage, thrombosis, perivascular exudation, and in chronic cases perivascular fibrosis. The poisons that are elaborated would probably cause fatty and other destructive changes in the nervous tissues themselves. The writers would expect the pia mater to be affected because of its analogy to the other serous membranes. In 2 fatal cases of chorea Reichart found small hemorrhages scattered irregularly throughout the brain, but bacteriological examination was negative. He also found fatty changes in the nerve fibres of brain and cord. Such changes result from an infection of the rheumatic type. The writers have demonstrated diplococci in the motor cortex and in the pia mater in the neighborhood of the capillaries. The diplococci must be rapidly destroyed, for chorea is comparable to rheumatic arthritis in the tendency to recover.

3. Rheumatic Meningitis.—A boy, aged 13, was admitted to hospital on Aug. 26, 1904, suffering from arthritis of the ankles and knees and pain across the chest upon drawing breath. The first attack of pain occurred 4 days before admission, the ankles commenced to swell 3 days before, and the knees upon the day previous. The temperature was 103.6° and the arthritis was of the usual type, the heart was dilated and there was a systolic mitral murmur which was conducted to the left axilla. Rest and salicylate of sodium rapidly reduced the temperature, and by the 30th all pain and swelling had disappeared. To prevent a relapse, small doses of salicylate were given. Convalescence was uninterrupted until Sept. 17, when he complained of headache and was sick, and the temperature rose to 102.4°. Next day he again vomited and suffered severe pain in the head. That evening he was drowsy and the temperature rose again to 102.6°. The bowels were constipated and an enema was given, after which he collapsed and became cyanosed and almost pulseless. At 8 a. m. on the 19th he became unconscious, with fixed dilated pupils and general muscular rigidity, alternating with flaccidity. The skin, though hot, was moist; the temperature in the axilla at 8 a. m. was 101°, and at 11 a. m. 102.4°. In the rectum the temperature was 106.4°. All treatment failed and he died comatose at 7.40 p. m.

The difference between the temperature in the axilla and in the rectum of over 4° is exceptional. In fact, if the rectal temperature had not been taken the hyperpyrexia would have escaped notice. The case was very puzzling, not only on this account but because the symptoms supervened without warning when the patient appeared to be quite convalescent. However, other cases have been recorded in which cerebral rheumatism supervened during convalescence. This condition may occur when the symptoms of rheumatism are slight as well as when they are severe. At the necropsy no changes were found in the affected joints. There were a slight excess of clear fluid in the pericardium, early mitral endocarditis in process of healing, and slight recent left pleuro-pericarditis. There was cerebral meningitis which was almost entirely basal and not suppurative. It resembled basal meningitis, except that it was more extensive. Turbid fluid was present with flakes of exudation over the medulla, pons, and cerebellum. There was also general spinal meningitis. Diplococci were found in the cerebro-spinal fluid, the spinal exudation, and the heart-blood.

What is the relation between the three rheumatic lesions of the brain—(1) rheumatic chorea; (2) rheumatic hyperpyrexia or cerebral rheumatism; and (3) rheumatic meningitis? In rheumatic hyperpyrexia no gross macroscopic lesion is found. But recent research has shown that there are very grave microscopic changes. Josué and Salomon in 1903 found diplococci in the pia mater and cerebral capillaries, and profound changes in the nerve cells of the frontal and motor cortex. Recently in a rapidly-fatal case diffuse chromatolysis was found. The writers think that the nervous lesion is an acute rheumatic toxemia, in contrast to the multiple and slight lesions which they believe exist in chorea. They would place rheumatic meningitis between these two lesions, because there is on the one hand profound poisoning and on the other a severe local lesion. They compare these nervous lesions to rheumatic lesions of other organs as follows:—

Mild rheumatic carditis and chorea.

Severe rheumatic pericarditis and rheumatic meningitis.

Acute fatal rheumatic cardiac dilatation and acute fatal rheumatic hyperpyrexia.

On the Epidemic Occurrence of Catarrhal Jaundice in Children in Prague and its Environs.—Langer (Prager med. Wochenschr., June 8th, 1905). Langer reviews the literature of the subject, noting especially those contributions devoted to the consideration of the disease in children. From these and Langer's own observations it would appear that in many large cities cases of jaundice appear with greater frequency in the spring and autumn than at other times, and that children, especially those between the ages of two and six years, are the chief sufferers. The chief predisposing cause appears to be an erroneous diet. Langer poses the question whether the disease is to be considered as an epidemic infection spreading from house to house, and patient to patient, or as an instance of a disease which owes its epidemic character entirely to extraneous circumstances. He leaves the point undetermined, but certainly inclines towards the first hypothesis, pointing out that the febrile onset, the enlargement of the spleen and the incidence of the disease in special streets and houses all agree with the known characteristics of a specific infection.

PEDIATRICS

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ORIGINAL ARTICLES

COMPLICATIONS OF SCARLET FEVER.

By William Hunter, M.D., F.R.C.P.

LECTURE DELIVERED AT CHARING CROSS HOSPITAL.

Gentlemen:—The cases to which I have to draw your attention to-day from the wards of the London Fever Hospital illustrate the features, and especially the complications, of scarlet fever. The disease is one, as you know, of very varying intensity—sometimes so mild that, but for the slight initial rash and the subsequent desquamation, it would almost pass unnoticed; sometimes among the severest of diseases in virtue of its own virulence, or still more of the complications to which it gives rise. It is usual to recognize three types of the disease, the mild or scarlatina benigna; a more severe type complicated with angina and glandular enlargement, scarlatina anginosa; and a third severe type, scarlatina maligna. If all cases of scarlet fever could be grouped under these three headings, prognosis would be a comparatively simple matter. But even a brief experience of scarlet fever soon brings out the fact that such a grouping is at the best but a rough one, and affords no help in the study of the individual case. The chief problem which the disease presents is to explain why a case originally of the mildest character may be subject to the severest complications, and why a severe case may run an uninterrupted course to recovery. In other words, the problem that scarlet fever presents is not the incidence of complications in a certain group of cases, but the incidence of complications in the individual case—why in one case, with everything in its favor apparently we have the severest of complications

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[1] British Medical Journal.

occurring, ending perhaps fatally; and why in another, which was very severe at the outset, the course should be of the most benign character.

First of all with regard to scarlet fever generally and its features, let me recall to you briefly what they are. Scarlet fever, as you know, is a fever which is characterized by sore throat, more or less adenitis, a specific rash, a specific desquamation, and a specific course, lasting usually for six weeks. The mode of onset is usually with sore throat, headache and vomiting, those occurring in about 85 per cent. of the cases. Sore throat is the commonest of these symptoms, headache the next. In addition to these specific symptoms, some cases present rigors and diarrhea, a few pain n the limbs, and a few present epistaxis.

THE RASH: DESQUAMATION.

I have here records showing the time of appearance of the rash in my last series of cases (150). The rash appears in half the cases on the second day. In 80 per cent. of the cases the rash appears on the first three days of the illness. The rash lasts about six days in over one-third of the cases, and in over one-half of the cases it lasts either five or six days. As regards the desquamation, during the first week the commonest place for desquamation to begin is at the root of the neck, and it usually begins there during the first week—that is to say, between the fourth and eighth days of the rash. Exceptionally it may begin in this region as late as the eighteenth day. On the fingers, in more than half the cases it appears between the ninth and twelfth days; in three-fourths of the cases it appears there between the ninth and the fourteenth, but it may appear even here as early as the fifth or as late as the twenty-second day. In the toes and feet it may appear late—that is to say, in nearly half the cases it commenced between the tenth and fifteenth day of the rash. It was exceptional for it to appear here before the tenth day. It was never observed there before the seventh day. In nearly half the cases it appears from the sixteenth to the thirty-first days—that is to say, on any of those days. Those are the features with regard to the rash and its onset.

LYMPHATIC GLANDS.

Now I want to mention the condition of the glands on admission. That is an important matter for this reason: it is in connection with the glands that the chief complications occur. A slight degree of adenitis is present in nearly all cases, and an interesting point has been to ascertain what is the relation of this initial adenitis to the secondary adenitis which occurs as a complication. I have therefore analyzed my cases to ascertain the relation of the initial clinical features to the subsequent complications of the disease.

COMPLICATIONS.

What are these complications? They are, in the first instance, adenitis, which occurs in very varying proportion. In this series it appeared in 19 per cent.* Albuminuria of two or more days' duration occurred in 21 per cent., and actual nephritis in 2.8 per cent., otorrhea and otitis in 6.4 per cent., rhinitis and rhinorrhea in 6.4 per cent., rheumatism in 4.3 per cent., secondary tonsilitis in 3.5 per cent. And in certain cases we get mastoiditis. I have also had as complications in my cases meningitis, optic neuritis, and ocular palsies. Those are the chief ones, ending up lastly with the severest form of all—septicemia, to which nearly all the deaths in my cases were due. Our mortality at the London Fever Hospital for the last year has been 0.8, which compares, I believe, with an average mortality of some 3 per cent. in other fever hospitals.

FACTORS DETERMINING THE SEVERITY OF COMPLICATIONS.

As I have said, there is no disease about which we have more facts than scarlet fever. The percentages of the complications and all the other facts relating to it can be expressed in figures drawn from thousands of cases. But none of these really throw light on the incidence and severity of the complications in the individual case. I have, therefore, in the last two or three years given considerable study to this matter, that is to say, the factors which determine the severity of complications in individual cases

To facilitate this study I have devised a graphic chart showing the whole of the features of every case on the front page. I have found it a great source of satisfaction in studying my cases, because every fact is plainly set forth, and can be related to every other, and I do not require to look at the back of the sheet in order to get further information about the history or the course of the disease, or the food the patient is getting. This chart is not only useful in scarlet fever, but you will find it an admirable chart for private cases generally. These are just the notes which I think you want to have before you to guide your treatment.

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*I include under the term "secondary adenitis" any enlargement of glands, however slight, after the initial adenitis has begun to subside. The percentage here noted—19 per cent.—includes therefore many mild cases which would not be generally regarded as "secondary adenitis." Thus the incidence of secondary adenitis given by Dr. Caiger is 8.7, "about one-third of which—for example, about 3 per cent.—suppurate." In my cases the proportion that suppurate is less than 1 per cent.

Let me describe a case of scarlet fever that illustrates the severity of these complications: A child, aged 6, was admitted with a mild attack of scarlet fever, with moderate rash, mild throat affection, and mild adenitis. The only other feature noticed was a slight nasal discharge. The course of the case was mild up to the seventh day. Then the temperature rose corresponding to the onset of slight adenitis. On the twenty-second day there was slight rheumatism in the wrists. On the twenty-fifth there was a marked attack of tonsilitis and pharyngitis and increased rhinorrhea, considerable fever up to 103° F., and lasting seven or eight days. On the twenty-eighth day congestion at the bases of the lungs. On the thirtieth there was nephritis and hematuria, with a large quantity of albumen in the urine. This albuminuria actually lasted from the thirtieth to the eightieth day, although the temperature during that period remained practically normal. The degree to which the patient's general health was affected by this lung illness is shown by the pulse curve. The pulse was weak and bad, ranging up to 120 instead of coming down to the normal. The temperature is usually the only feature recorded graphically, but there are other factors which can be shown graphically, and the temperature is perhaps the least important.

That, then, is an illustration of severe complications following a case of scarlet fever which in its early stage was mild. I now show you another which I have had prepared, that of a boy aged 12. This, again, was a moderately severe attack of scarlet fever, with temperature coming down to the normal on the tenth day, and remaining normal to the seventeenth. Then there was a slight rise of temperature and pulse attended by adenitis. On the twenty-fifth day a still further rise took place marked by an increase in the adenitis, and then an irregular pulse for four or five days, while the temperature was normal.

The last case whose chart I show you is that of a patient under my care in the last few weeks. It is that of a woman, aged 24, who was employed in a bar, which perhaps rather affected her powers of resistance afterwards. She came in with a mild or fairly moderate degree of scarlet fever, moderate rash, slight angina, and slight adenitis. You will notice that her temperature fell to normal on the fourth day. Yet the rash did not disappear, though it was moderate, and on the twelfth day the temperature rose suddenly, attended by severe angina, increase of adenitis, vomiting and diarrhea. On the thirteenth day there was severe tonsilitis, and on the seventeenth day the tonsilitis was increased and further complicated by cellulitis. The temperature at this time was 103°, at which point it continued, and on the eighteenth day the rash, which had persisted all through, became most intense again. On the twentieth day at 6 p.m., the temperature shot up to 107.8°, and, in spite of bath treatment and cold douching and spraying, she died five hours later.

PRIMARY AND SECONDARY INFECTION.

That is a case which, speaking generally, actually makes one wonder what happened. She was a fairly healthy person, who had a mild attack, and yet the disease became very severe and ended fatally. It is the typical sort of case with which we have to deal in this disease, illustrating the two great factors. We are dealing with two classes of infection: (1) the original infection of the scarlet fever; and (2) the occurrence of complications, mostly septic; and the problem which scarlet fever presents is which of these factors is operating in any one case. We cannot eliminate the original infection—the patient has acquired that; but the question arises as to whether we can subordinate or control the septic factor and the septic complications, and it is that problem in which I have tried to interest myself in these series of cases, with results which I will now briefly indicate.

RELATION OF INITIAL SYMPTOMS TO COMPLICATIONS.

First of all, with regard to the relation of the initial features to these complications. The initial features I refer to are, first, the rash, secondly the angina, and thirdly the fever.

1. *Rash.*—The first fact which comes out is this, with regard to the rash, that the degree of the rash has some little influence on the height of the initial fever, and slightly more on the duration of the pyrexia, but it is not related to the subsequent severity of the case. One often thinks: here is a case with a severe rash, so it must be a bad case; here is another one with only a moderate rash, and that evidently is a mild case. But that theory does not work out in practice. A case with a severe rash may pursue a mild course. On the other hand, a moderate rash may appear in a case which later may become complicated by all these other conditions. On the whole, however, a severe rash is more likely to be followed by complications than a mild rash. This is best seen in the case of adenitis.

TABLE I.

Degree of Rash.	No. of Cases.	No. with Complications.	Percentage.
Slight	34	12	35
Medium	49	14	28
Marked	39	19	49

TABLE II.

Rash.	No. of Cases.	No. with Adenitis.	Percentage.
Slight	34	5	14
Medium	49	7	14
Marked	39	13	33

2. *Initial Angina.*—The next point is the relation of initial angina to the subsequent occurrence of complications—secondary angina, especially adenitis. There is some relation between the severity of the initial angina and the tendency to the occurrence of secondary adenitis, but this is not so close or so general as to account for the occurrence of this secondary adenitis. In no less than 81 per cent. of cases in which this occurred the initial angina was only slight or moderate. The liability to secondary adenitis increased, however, in proportion to the severity of the primary.

3. *Fever.*—There is no actual definite relation between the height of the temperature in the first instance and the occurrence of complications.

The subsequent incidence of complications is thus not sufficiently accounted for by the character of the initial features; other causes to which these complications (in the individual case) can be ascribed have to be sought for, and are not easily found. According to Dr. Caiger, "there is no connection between this adenitis and either cold, damp, diet, or habits. Probably some widespread causative influences, some atmospheric or soil condiditions, are responsible, and about one-third of the cases suppurate."

RELATION OF ORAL SEPSIS TO COMPLICATIONS.

I have therefore studied the relation of other features to the septic complications. The difficulty about scarlet fever is to determine how far the complications are scarlatinal, and how far they are septic. The two infections are closely intermixed, and they are apparently of the same character, that is streptococcal, so that it is extremely difficult to separate them. I have, therefore, in my series of cases made observations about the presence of septic lesions in connection with scarlet fever cases on admission. The particular sepsis is that connected with the mouth and the result has been very interesting. I have taken note of the presence and degree of "oral sepsis" in all cases admitted, the presence of foul sores around the teeth, foul gingivitis, and I have watched the relation of this condition to the subsequent occurrence of complications. So far as I can gather, this line of investigation has not hitherto been followed, and that is the more remarkable as the conditions of such sepsis are sometimes of a very severe kind. The result cannot be shortly expressed statistically, because of the prevalence of this condition, but one result comes out clearly: that the severity of scarlet fever, that is to say of the septic complications of it, is greatly influenced by the degree of oral sepsis in the patient before he is admitted. This is not surprising, considering that the actual lesion in scarlet fever is in the throat, and the simple addition to this of ta staphylococcal infection may be a very serious matter. Thus of cases without oral sepsis only 35 per cent. had complications of moderate or severe degree; whereas of cases with oral sepsis 66 per cent. showed such complications. The result is that oral sepsis affects both the number and still more the severity of the complications met with.

1. *Oral Sepsis in Relation to the Severity of the Initial Angina.*—The figures bring out this result. The severity of the initial angina is affected by the presence of this previous sepsis. Thus, in 51 cases without oral sepsis, severe angina was only met with in 3 cases (6 per cent.), and it was moderate in 14 cases (28 per cent.), In 34 cases (67 per cent.), it was of mild degree. On the other hand, in 10 cases with severe oral sepsis

only 2 (20 per cent.) showed mild angina. In 8 (80 per cent.) the angina was severe. Bacteriological examination showed that this increased severity was associated with the presence of staphylococcal organisms. Thus, in 14 cases without oral sepsis, staphylococci were isolated from the tonsils in 6 cases, whereas in 19 cases with oral sepsis, staphylococci were isolated in 17 cases.

2. *Oral Sepsis in Relation to the Occurrence of the Secondary Angina.*—In 60 per cent. of the cases having this oral sepsis in which complications occurred, the oral sepsis was noted to be very severe. The last case I have described to you illustrates this very well. Here is my note of it. Rash, moderate; angina, moderate; adenitis, moderate. Yet the one fact noted in connection with that is that there was the severest degree of oral sepsis, with an abscess round one of her teeth. The subsequent course of this case was the severest angina, the severest adenitis, and the severest cellulitis. The patient also had vomiting, and she had diarrhea, denoting "septic gastritis" and "septic enteritis," and afterwards hyperpyrexia occurred and death.

3. *The Relation of Oral Sepsis to the Severity of the Complications.*—This is very striking. I have here notes of 7 cases. The seven cases in which oral sepsis was noted to be severe were nearly all severe. Two patients had severe adenitis, severe septic enteritis, and septic rash; the third had angina of severe degree, rheumatism very severe, albuminuria lasting 34 days, gangrenous stomatitis, which gave the greatest trouble, septic gastritis, enteritis, and finally pyemic abscesses in the hip, from which streptococcus was isolated. These were all in the case of one patient who eventually recovered. The fourth patient had adenitis twice; the fifth had rheumatism and albuminuria lasting nine days; the sixth had severe angina, and the severest form of otitis lasting six weeks. In other words, 6 out of the 7 cases in which this condition of severe tonsilitis was noticed were actually very severe cases, both as regards the degree and the variety of the complications.

Now let me note another fact in connection with oral sepsis in relation to complications as a whole. The actual frequency of the occurrence of complications of some kind or another is but little affected by the presence or absence of oral sepsis, but the number of complications met with in cases of oral sepsis is much higher than in those without it. And still more, the severity of the complications met with is much greater. In cases of oral sepsis, 66 per cent. had complications of moderate or severest degree, whereas only 35 per cent. had such complications in cases in which there was no oral sepsis. This is well brought out by taking any one complication, such as tonsilitis, to which the figures I have given you refer. With regard to the relation of oral sepsis to albuminuria, 30 per cent. of the cases had albuminuria. In the cases without oral sepsis the average duration of the albuminuria was 5.8 days. In cases with oral sepsis the average duration was 15.1 days. In cases with oral sepsis and cellulitis the figures are equally divided. Of rhinitis we had 13 cases. No oral sepsis in 7, and those 7 cases were of mild degree. Oral sepsis was present in 6, 2 of them of mild degree, 2 of moderate degree, 2 of severest degree. Next with regard to oral sepsis and otitis. There were 12 cases. No oral sepsis in 6 cases; 5 of them were of mildest degree. Oral sepsis in 6 cases; 2 of them were of mildest degree, 1 of moderate degree, and 3 of severest degree. Oral sepsis and rheumatism we will take next—20 cases. Without oral sepsis, 10 cases, all of them of mildest degree; with oral sepsis, 10 cases, the slightest degree in 7, severe or moderate in 3.

Time will not permit me to go further, but I hope enough has been said to bring out the fact that this class of work is of interest. We cannot deal directly with the scarlatinal factor, but with the septic factor we can deal; and these figures bring out the fact that there is a definite relation, as one would expect, between the actual existence of oral sepsis in a patient with scarlet fever and the severest complications. It must be remembered in all these cases I removed the oral sepsis immediately, and did not leave them to, as it were, soak in their oral sepsis and yet that is what has been done hitherto. Usually no care has been taken to remove this source of infection. So these figures do not bring out the true relation. To do that it would be necessary to compare this series of cases with a parallel series in which the oral sepsis had been observed and yet nothing done for it. Of this class I have no cases; for in all cases which have come under my care the condition has been immediately treated antiseptically by swabbing out, and carefully removing the sepsis from the mouth. Despite these precautions, the existence of oral sepsis at the time of contraction of the disease has influenced the primary angina, the subsequent occurrence of tonsilitis, of adenitis, and especially has undoubtedly influenced the severity of the complications afterwards.

The practical outcome, irrespective of mere statistical considerations as to whether oral sepsis does or does not influence scarlet fever, is that it is absolutely necessary to remove even the chance of it doing so. Therefore it is to me a very important duty, in all cases of fever coming under my care, to endeavor to eliminate this factor os far as possible. So I do not wait to find out what it is going to do, but I remove it, as I should remove any other possible source of trouble, just as I should give the patient fresh air, good food, or see that he was kept properly clean. That is the general outcome of this work and I think you will find that in the cases which come under your care you will derive the greatest possible satisfaction yourself and you will confer the greatest possible benefit on your patients by dealing with this as you would with any other possible element of danger in connection with the case. The prima facie case for dealing with it seriously in scarlet fever is, I think, greater than in any other fever with which we have to deal.

As I showed in a previous communication, it is no less important in enteric fever, in which disease, according to my observations, the septic factor is an important cause of the chief intestinal complications—perforation and hemorrhage.

The sepsis associated with these two fevers and responsible for the chief complications is thus, in my experience and judgment, largely a preventable condition, and the question I now leave with you is this: If preventable, why not prevented?

THE TREATMENT OF SCARLET FEVER[1]

By C. F. Shollenberger, M. D.,

DENVER, COLO.

There is no disease of infancy and childhood which, depending upon the type, requires so little or so much careful therapeutic assistance as scarlet fever.

The milder cases require very little if any treatment, but to prevent complications or sequelae, the patient should remain in bed at least a week after the fever has subsided and be kept on liquid diet, preferably milk, during the course of the disease and for a period of ten days or two weeks after the disappearance of the eruption. In fact, careful attention to diet will, in a large percentage of the milder cases, prevent those unfortunate attacks of acute nephritis, which come on just when we congratulate ourselves that our patients are "out of the woods."

Necessarily, with so highly contagious a disease as scarlet fever, prophylactic measures are very important.

A circular, issued by the Michigan State Board of Health, gives such excellent advice that I take the liberty of quoting it in full:

"How to Avoid and Prevent Scarlet Fever."

(a) "Avoid the special contagion of the disease. It is especially important that this should be observed by children, and all whose throats are sore from any cause. Children under ten years of age are in much greater danger of death from scarlet fever than are adults, but adult persons often contract and spread the disease, and sometimes die from it. Mild cases in adults may thus cause fatal cases among children. Because of these facts it is frequently dangerous for children to go where adult persons go with almost perfect safety to themselves."

(b) "Do not let a child go near a case of scarlet fever. Do not permit any person or any animal to come, or anything to be brought directly from a case of scarlet fever to a child. Unless your services are needed keep away from the disease yourself. If you do visit a case bathe yourself and change and disinfect your clothing before you go where there is a child."

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[1] Denver Medical Times.

(c) "The contagion of scarlet fever may retain its virulence for some time, and be carried a long distance in various substances and articles in which it may have found lodgment. Do not permit a child to enter a privy or water closet, or breathe the air from a privy, water-closet, cesspool or sewer into which non-disinfected discharges from persons sick with scarlet fever have entered, or to drink water or milk which has been exposed to such air."

(d) "Do not permit a child to ride in a closed carriage in which there has been a person sick with scarlet fever, unless the carriage has since been thoroughly disinfected with fumes of burning sulphur," etc.

(e) "During the prevalence of scarlet fever in epidemic form, avoid exposure to wind and to breathing cold, dry air; also the use of strong vinegar or any other substance which tends to make the throat raw and tender."

(f) "Do not wear or handle clothing worn by persons during their sickness or convalescence from scarlet fever."

(g) "Beware of any person who has a sore throat. Do not kiss such a person. Do not drink from the same cup, nor use any article that has been used by a person sick with this disease."

(h) "Beware of crowded assemblies in unventilated rooms."

(i) "Do not permit a child to drink water, or take food which comes from a source that renders it liable to contain something derived from a person sick with scarlet fever."

In every case, no matter how mild it may be, as soon as the diagnosis is positive, isolation should be strictly enforced and continued until all danger of contagion is past.

This period of strict isolation may cover a period from four to eight weeks.

The patient should be placed in a well ventilated room, preferably with two windows, and having a sunny exposure. All draperies, curtains and other furnishings, except such as are necessary to the comfort and care of the patient, should be removed from the room.

Closets should be emptied and all wall ornaments removed. All carpets should be taken up, and old pieces of clean carpet or matting, which can afterwards be distroyed, take its place.

The patient should rest upon a metal bedstead, and the bedding should be of such a character that it may be thoroughly sterilized and fumigated after convalescence has been established.

The nurse should take every precaution to prevent contagion and, if practicable, should under no circumstances be alowed to come in contact with other members of the family.

In place of handkerchiefs I should prefer the use of sterilized gauze or old linen, cut into the required sizes, and these should be burned immediately after use.

It is scarcely necessary to state that the physician who is in daily attendance on the case should exercise every precaution to prevent the disease from being carried by himself to the members of other families in which he may be in attendance.

It is a well established fact and possibly more frequently than the profession thinks that the disease has been carried by physicians from house to house, and every hygienic and preventive measure known to the attending physician should be used to prevent such an unfortunate occurrence.

In severe epidemics the public and private schools should be closed, and in all cities and towns where health boards have been established there should be regular inspection of the schools and school children. I believe that such inspection would, in a comparatively short time, show decided improvement in the lessened number of contagious diseases. The unaffected children of the household should be sent away and kept away until all danger of contagion from the original case is gone.

Personal Hygiene.—This is a matter of great importance and in all cases, mild or severe, the secretions from the nose, throat and mouth, should be removed on old handkerchiefs or pieces of linen, and immediately burned.

The fecal and urinary discharges should be disinfected, and when sewer connections are lacking, should be buried some distance from the house, or from a running stream of water or a well. The discharges from the ear should be removed with absorbent cotton and at once destroyed.

All linen, towels and bedding should receive thorough disinfection before being taken from the room, and whenever practicable a special set of dishes, glasses and feeding utensils should be placed at the disposal of the nurse.

When the patient has completely recovered and the period of quarantine is at an end, give the child a good bath, put on clean, soft-textured clothing and remove to an uninfected room.

The sick room, after the removal of the patient, should immediately be disinfected by means of sulphur or formaldehyde gas, and during the process of fumigation every article of dress, etc., should be carefully spread out so as to allow free access to the fumes.

The bed, furniture, utensils, should be washed in a strong solution of carbolic acid, 1 to 20, or corrosive sublimate, 1 to 200-500. All books and toys which have been in the sick room and constantly handled should be destroyed. Failure to observe this simple precaution has carried death into more than one household.

In case of death, public funerals should under no circumstances be allowed, but the burial should be private, and as soon as possible.

General Hygiene.—The hygiene of the sick room is always a matter of importance, and even during the winter months provision should be made for an abundance of fresh air.

Under all circumstances the atmosphere of the room must be kept pure and fresh and at a temperature ranging from 65° to 70° F.

Care should be taken to prevent exposure to drafts either directly or indirectly. Keep a child in bed even in the mildest cases, but how long the patient should be kept in bed will depend upon each individual case. Ordinarily the child should be kept in bed for at least ten days after the fever has subsided.

By observing this precaution the danger of late renal complications will be greatly lessened. The urine should be examined frequently, so as to keep informed concerning any changes going on in the kidneys. A sponge bath should be given once or twice a day, and during the period of desquamation or at any time when the symptom is accompanied by excessive itching some soothing lotion should be applied to the entire body. The following formula has given excellent results in many of my cases:

℞ Menthol, gr. x.
Ung. zinci oxidi, ℥ss.
Lanolini, ad q. s., ℥ss.
M. Signa: Apply locally.

Diet.—During the entire course of the disease the diet should be of a mild but nutritious character. During the first two weeks nothing but milk or beef broth, chicken or mutton broth should be given, and after that time any change in diet must depend upon the age and general condition of the patient.

After the pulse and temperature have been normal for a week, oatmeal, soft boiled eggs, toast, etc., may be given, and then a gradual return to the usual diet may be allowed. Although authorities differ as to an exclusive liquid diet, I believe that if such a course is followed, especially during the febrile stage, there will be far less danger of nephritic complications. The main thing to be remembered is so to regulate the diet that the already overtaxed organs may have as little work to do as possible, and to aid, so far as possible, in the elimination of the scarlatinal poison through the kidneys.

Allow the patient plenty of water, as my experience has taught me that it is one of the best and most useful of diuretics.

Medical Treatment.—Unfortunately up to this time the profession has discovered no specific treatment for scarlet fever and all our efforts must rest upon a symptomatic basis.

The serum treatment has proved of little avail and, until the isolation and cultivation of the specific micro-organism has been accomplished, little good from serum-therapy can be expected. In the vast majority of the mildest cases little treatment is necessary.

Rest in bed, proper diet, careful nursing, with local treatment of the throat symptoms, may be all that is necessary.

It is to be remembered, however, that during the course of even the mildest cases, serious complications may arise, and the careful physician will constantly be on guard against any such contingency.

Fever.—Hydrotherapy is one of the best means of treating increased temperature. This may be applied in the form of cold sponging, the cold wet pack, or cold bath, depending upon the individual case. The use of cold water has an excellent effect upon the various nervous phenomena that so often manifest themselves in this disease. Ice bags to the head are often very serviceable. It is advisable in the use of cold baths, to have the water luke warm and gradually add cold water until the desired temperature of the bath is secured. Medicinal antipyretics are often serviceable, but will not prove as useful as hydrotherapy. In the milder cases where the temperature ranges from 100° to 102½°, and there are no heart complications, the following formula has often given excellent results:

℞ Tinc. aconit, gtt. xxxii.
Antipyrin, gr. xxxii.
Liq. ammonia acetatis, ℥ss.
Syrupum, q. s., ad ℥ii.
M. Sig.: Teaspoonful every 4 hours for child 6 years old.

Occasionally a very hot bath will do more good than cold water, especially in cases accompanied by active delirium and

Quinine and phenacetin will often prove serviceable.

pronounced nephritic complications.

When the active delirium is not controlled by hydrotherapy, potassium bromide or chloral hydrate may be given in addition to the cold bath.

The Throat.—Special attention should always be given to the throat, even in mildest cases. Older children and adults can use some mild antiseptic gargle whereas in young children spraying should be followed. For this purpose various antiseptic solutions can be used—hydrogen-peroxide, boric acid, etc. Small pieces of ice held in the mouth are often very soothing.

In the line of general treatment there is nothing better than tincture of the chloride of iron. When the stomach is in good condition this preparation may be given in from 3 to

10-drop doses every three hours, depending upon the age of the patient.

Most of the uncomplicated cases will pass through the disease safely without the use of stimulants, but at the first sign of any weakness of the heart's action recourse should be had to whiskey or brandy or a good port wine. Strychnine sulphate in doses of 1-100 to 1-40 grain may be given every three to six hours. With the first appearance of septic or toxic symptoms, energetic stimulation must be practiced at once. Caffeine, sparteine, musk, strophanthus, digitalis, may all be indicated at some time or other during the graver periods of the disease. In fact, bold stimulation should be the rule when cardiac failure is imminent.

Complications.—It is in the treatment of the many complications that may ensue that our highest efforts and best skill will be demanded.

In the septic cases with severe angina active measures must be used to prevent spreading of the local process.

Ice bags or cold cloths should be applied to the throat and neck, while the mouth and pharynx should be rendered as aseptic as possible by various sprays, such as hydrogen peroxide, potassium permanganate, chlorate of potassium, listerine, boric acid, carbolic acid, etc.

Should the pseudo membrane show any tendency to spread beyond the tonsils, a culture should at once be taken and, if the presence of diphtheria is shown, antitoxin should immediately be administered in large quantity and repeated as may be indicated.

If diphtheria manifests itself as a complication, special attention must be given to the condition of the heart, as in its already overtaxed condition from the scarlatinal virus, diphtheritic cardiac paralysis is more likely to ensue.

Otitis.—Unfortunately, in many cases of otitis media the first indication is a discharge of pus from the external canal, and in such cases, of course, nothing can be done in the way of early preventive treatment. Where it is practicable thorough irrigation of the fauces should be followed in scarlet fever cases to prevent the inflammatory process from spreading to the middle ear.

In many cases our younger patients will fight this treatment very stubbornly, and under such conditions, where force is used, more harm than good may result.

Watch carefully for any signs of earache or pain referred to either ear. When such signs present themselves, the instillation of hot water may be all that is necessary to relieve the distress. If this fails, a solution containing 5 gtt. of tinct. opii and 8 to 10 gtt. of a 5 per cent. solution of cocaine, will often give quick relief. The application of the hot water bottle or a thin bag filled with hot salt and hops will often act nicely. Should an examination of the ear show the presence of pus, as indicated by the bulging and opacity of the membrane, the membrane should immediately be incised. The ear should then be irrigated three times a day with a 50 per cent. solution of hydrogen peroxide. The membrane should not be allowed to close pernamently, but incised again and again if found necessary, as the free evacuation of the pus is very essential to prevent impairment of hearing.

Should the discharge persist after convalescence, irrigation must be continued at least twice a day, changing the medicament, if thought best, until the pus has ceased to flow.

Glandular Treatment.—The enlargement of the glands of the neck is often a very painful and distressing complication and should be energetically treated by ice bags or cold cloths. Where the condition persists the cold applications should be continued for thirty-six to forty-eight hours, and, if no improvement is noticed, hot poultices should be applied, and at the first sign of fluctuation a free incision should be made, followed by antiseptic irrigation and dressing.

Arthritis.—This complication is usually not severe and in the vast majority of cases will yield to local treatment. The following formula has often given excellent results.

℞ Tinc. aconiti, ℥ss.
Tinc. opii.
Chloroformi, aa. ʒ vi.
Lin. saponis, q. s., ad ℥iv.
M. Signa: To be applied locally three or four times a day.

It may be well to wrap the infected joints in absorbent cotton, following the above application. Although not a true rheumatic arthritis, small doses of sodium salicylate have often given excellent results.

Cardiac Complications.— Endocarditis and pericarditis frequently complicate scarlet fever and require careful remedial attention. Digitalis, strychnine sulph., sparteine and other stimulants may be found necessary. Ice bags should be used over the heart, and the recumbent position insisted upon until all danger of sudden collapse has passed.

The very severe stomatitis that is occasionally met with can generally be conquered by thorough asepsis. In the rare cases, where sloughing and gangrene take place, a strong solution of silver nitrate may be found necessary. Local anaesthesia, followed by the use of nitrate of silver pencil, will often give excellent results.

Gastro-Enteritis.—One of the most distressing complications and one which greatly interferes with advantageous medication per mouth is excessive gastric irritability. The vomiting at times is so excessive and continuous that nothing will be retained for many hours.

Large and frequent doses of bismuth subnitrate will prove very useful. Minute doses of cocaine muriate may be given. Calomel, tinct. nucis vomicae, aqua calcis, ingluvin, the ice bag or mustard drafts applied to gastric region will often give excellent results. Rectal feeding must be followed until vomiting ceases and then normal feeding slowly resumed.

Pleurisy, Pneumonia and Bronchitis.—The above complications are not met with so frequently in scarlet fever as in measles, and when found should be treated as under ordinary conditions, but sustaining and stimulating remedies must be used from their first appearance. It is to be remembered that the exudation in pleurisy as a complication of scarlet fever very often becomes purulent and prompt evacuation must be insisted upon.

Nephritis.—This complication is the most dreaded of all, and in mild or severe form is so frequently present that it is almost pathognomonic of the disease.

To be on the safe side daily examination of the urine should be made for ten days to two weeks in even the mildest cases, for from the beginning of the eruption evidences of renal catarrh will manifest themselves. A diminution in the quantity of urine is always a symptom of danger and must not be lightly regarded.

In many cases scarlatinal dropsy is often the first symptom of nephritis, especially in those mild cases which are supposed by the parents, and even the physician, to be well advanced in convalescence. Should the urine decrease in quantity and dropsy appear, energetic measures must be used to make the skin and intestines do the work ordinarily assumed by the kidneys.

If the stomach is tolerant, allow the patient to drink large quantities of distilled or artesian water, for water is always an excellent diuretic.

If the urine still remains scanty, diaphoresis must be induced, first by means of baths, hot packs, steaming, hot dry air, hot drinks, etc. The hot pack will often produce free perspiration and not only is this good effect produced, but in the vast majority of cases is followed by a marked increase in the quantity of urine.

A very simple method of producing free sweating is to envelop the child in flannel blankets, the head exposed, and place between the patient's limbs a bucket of hot water in which hot bricks or flat irons may be placed as the water cools. Bottles filled with hot water can be placed under the arm pits, care must be taken to prevent injury to the skin. If drugs are used, the various preparations of jaborandi will be found serviceable. A hot infusion of the leaves often acts as an excellent diaphoretic and may be sipped until the desired effect is produced.

If it were not for the dangers connected with its use nothing would act more quickly in producing profuse diaphoresis than hypodermic injections of muriate of pilocarpine in doses of 1-50 to 1-30 of a grain. Unfortunately it not only sweats the outside but the inside of the body and distressing symptoms may arise. However, as a dernier resort, if diaphoresis could not be produced in any other way, I certainly should not hesitate to use this drug.

Where there is marked dropsical effusion, the free use of an acute hydragogue cathartic is indicated, and there certainly is none better than compound jalap powder. Our younger patients will often object strenuously to this remedy, and here a cream of tartar lemonade may be substituted, sweetened to the taste and flavored with a mild claret or port wine.

It is to be remembered that active catharsis must not be induced too frequently, for a marked anemia may follow, a result greatly to be deplored.

After the active congestion of the kidneys has been reduced, a stimulating diuretic should be given and I know of nothing better than the following formula:

℞ Potassi acetatis, ʒii.
Infusi digitalis, F. ℥iij.
M. Sig.: One teaspoonful every four hours.

Local treatment, in the way of flaxseed or mustard poultices placed over the kidneys will often have a stimulating effect and help to relieve the backache that is so often present.

Some foreign authorities recommend the use of leeches applied over the kidneys. Others recommend dry cupping, but these measures are often objectionable to the younger patients.

Should uremic convulsions ensue, energetic measures must at once be used to produce free diaphoresis. Should the physician be present while the convulsions are taking place, chloroform may be used to allay the violence of the attack, but it is almost needless to state that the administration of an anesthetic must be delegated to no one but a physician. It may be necessary to administer elix. bromid. potassii or chloral hydrate in the interval of the convulsive seizure.

Resume.—Keep patient in bed and on a liquid diet until all danger of cardiac or renal complication has passed. Remember that prophylaxis is of great importance in the disease.

Bear in mind that there is no specific treatment for scarlet fever; hence follow no routine plan, but treat the individual case according to the symptoms and complications as they may arise.

Follow the case during convalescence, and if possible see that perfect health is restored before patient is discharged.

ETIOLOGY AND PREVENTIVE TREATMENT OF SCARLATINAL NEPHRITIS*

By H. Lowenburg, A.M., M.D.,

OF PHILADELPHIA.

In presenting a paper on the etiology and prevention of scarlatinal nephritis, it is not my purpose to attempt any addition to our knowledge, but rather to emphasize the importance of already-known facts. In striving to control any morbid process, that system of therapeutics should be regarded as best which attempts the destruction of etiologic factors or seeks to mitigate their malign influences on the economy. In dealing with the acute infectious diseases the greatest advances have been made along the line of prevention.

This fact has received special emphasis in those diseases in which the habits of the several specific germs and their means of transmission have been carefully studied. This has been notably illustrated in tuberculosis, diphtheria, malaria and, more recently, in yellow fever. Many diseases are rightly regarded as specific even in the absence of evidence sufficient to demonstrate any special organism as the active agent. Among diseases of this character scarlet fever stands pre-eminent. These diseases are best prevented by applying to them the same principles of isolation, disinfection and quarantine which are of value in preventing those maladies which are known to be specific. After the inception of such a disease, in the present state of our knowledge, our province is not to attempt to abort or to cure, but to recognize the possible complications and the sequlæ in order that we may either prevent them or mitigate their severity. With respect to scarlatina this is especially true. The disease is self-limited and entirely uninfluenced by drugs. The formerly much-vaunted specifics, sodium benzoate, sodium salicylate, belladonna, etc., have been justly discarded as such. The greatest mortality and morbidity of scarlet fever must be accredited to its complications and sequelæ which are more far-reaching and produce more human wrecks than those of any of the other acute infectious exanthemata.

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*Read before the Northern Medical Association, Oct. 27, 1905. Courtesy Journal American Medical Association.

SCARLATINA AND NEPHRITIS.

Not the least interesting of these complications and sequelæ is nephritis. As humanitarians, as well as physicians, it becomes our function to note carefully the etiologic factors concerned in the production of this serious ailment in an attempt to apply such knowledge to its prevention.

The types of this affection are exceedingly variable. From a careful study of the urine it may be learned that, in the beginning, there occurs a form of albuminuria, sometimes associated with a few hyaline casts and epithelial scales, which is more or less common to the initial febrile stage of nearly all the acute infectious diseases. Then there is noted the acutely septic form of kidney disease which occurs as a complication in the very malignant cases which are rapidly fatal. So rapid is the course that suppression of the urine and death from uremia occur here often without edema. This type of nephritis is perhaps best described as a part of a universal sepsis, the toxin of which spends its greatest force on the renal tissue. Occurring in varying degrees of severity we have also that well-known form of renal involvement which makes its appearance during the third and fourth week of the disease or after convalescence has been established. This is the so-called post-scarlatinal nephritis, and occurs with a more or less insidious onset, and unless detected early, may lead to serious chronic kidney disease. There is also met what may be designated recurrent intermittent post-scarlatinal albuminuria. This form has received little if any attention at the hands of medical writers, and yet its existence must have been noted by those who have had a greater clinical experience than I. This form of albuminuria occurs in many of these patients who have suffered from even a mild post-scarlatinal nephritis. It is influenced greatly by exercise and diet. Excess in both these factors acts as excitant of attack, while a reduction in both is universally preventive and curative. The condition, in my limited experience at least, is compatible with apparently robust health. I have noted it at least two years after an attack of scarlet fever. I have not been able to detect tube casts associated with it.

ETIOLOGIC FACTORS.

Scarlatina is a disease peculiarly suited to the occurrence of nephritis. During an attack of this disease, covering a period of from four to eight weeks, perhaps there is, during the first half of this time, at least, almost complete destruction of skin function. In this manner the disease is not entirely unlike a severe burn of the first degree both in appearance and in its effect on kidney substance. The kidney, already overworked and overirritated, is thus forced to compensate for this loss of skin function.

Other important etiologic factors may be found in the increased toxicity and the increased acidity of the urine. Of the two the former is by far the more important. Whatever the real poison of scarlet fever may be, without doubt it is removed from the economy via the urine, and, unfortunately, it seems to possess a peculiarly irritant effect on the kidney. This statement receives color from the fact that from apparently the mildest attacks of scarlet fever may follow the most serious and persistent attacks of nephritis. In fact, J. Lewis Smith records a case in which the mother, previously known to be healthy, while nursing her son who was suffering from scarlet fever, complained of symptoms which led to a urinary examination, which revealed albumin and casts. Smith regards this as a case in which the nephritis was the only symptom, and cites it as an example of the severely irritating effect of the scarlatinal poison on the kidney. The patient in this instance made a perfect recovery. The frequency and seriousness of kidney irritation has received emphasis from the work of Sörensen, who has demonstrated postmortem renal lesions in patients who exhibited no clinical features of the disease. This statement seems to prove that the irritant is local and produces the morbid changes early. In order to be local it must be in the solution of the urine. J. Lewis Smith also cites[1] the cases of four girls in the same family who had suffered from desquamative nephritis, after only one of the four had scarlet fever.

The increased acidity of the urine can be readily determined by analysis. Although not such a potent factor, its influence as a producer of kidney irritation can be readily assumed. It is probably the cause of the early albuminuria and unless permitted to continue, does not cause serious degenerative changes in the renal tissue. The recognition of this fact has an important bearing on our efforts to prevent this affection. The relationship between the concentration of the urine and its acidity is a positive one, and therefore it, too, becomes an important etiologic factor.

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[1] From the British Medical Journal, Nov. 29, 1879.

Constipation, by preventing the escape of morbific material via the intestinal tract, thereby permits an increase of the toxins in an already overloaded urine. In this manner it may assume the rôle of an important contributory agent. The same may be said of diet. Dietary indiscretion may be nominated as the most important of any single casual factor. This is especially true when highly organized proteid substances, such as meats, are too early added. These substances act by increasing the toxicity and the acidity of the urine.

The influence of cold can not be entirely disregarded. Its place, however, as a cause of scarlatinal nephritis has not been fully defined. In discussing this point Tyson remarks that "children have been found barefoot in the street with the eruption on them, and yet have escaped Bright's disease." In detailing the prophylaxis of the latter, the same author, however, proceeds thus: "Whatever may be the immediate cause of the renal involvement, it is certain that cold often becomes its exciting cause." Jacobi affirms that "exposure and sudden changes of temperature will always hold their place in etiology, in the minds of those who do not forget to notice the living case besides the microscopic excrement." My own belief is that it is a factor of much importance in susceptible and anemic patients. The greatest danger lies in a poorly regulated room temperature, sudden draughts and chilling of the surface by careless bathing. By these means the blood is rapidly driven from the surface capillaries and intense congestion of the internal viscera results.

PREVENTIVE TREATMENT.

The patient should be placed in a well-ventilated room, the temperature of which should be about 68 to 70 degrees, and should be kept uniformly even. If possible, a room of southern exposure is to be selected. Draughts and sudden changes of temperature are to be avoided.

Diet.—A careful regulation of the diet is essential to the prevention of nephritis. The best diet for scarlet fever patients is milk. It may be given modified to suit the age if the patient be a healthy bottle-fed baby. If a nursling, maternal milk should constitute the sole source of nourishment. The milk is to be secured with a breast pump. Older children may be given whole milk or milk diluted with a cereal water, lime water or Vichy. If digestion be weak the milk is best exhibited peptonized. However given, milk should be practically the sole article of diet for a period covering from four to six weeks or until desquamation is complete. Experience bears out the observation of Jaccoud that an absolute milk diet is of great service in preventing nephritis. Fruit juices serve a useful purpose by rendering the urine alkaline, and they are very refreshing. Toward the end of the period of desquamation freshly cooked tender vegetables, fruits and farinaceous substances may be cautiously added. Proteids may now be carefully given and only in small quantity. These are gradually increased in quantity and quality as tolerance is established. Throughout the course of scarlet fever, from the beginning, and, especially following each change in diet, the urine should be submitted to a careful daily analysis. On the appearance of the least trace of albumin a return to an absolute milk diet must be made at once.

Hydrotherapy.—Asked to designate any one single remedy which is of the greatest service in preventing scarlatinal nephritis, I should unhesitatingly name water. Its free and continuous use is indicated for the reason that, by increasing the amount of urine, it dilutes toxins and diminishes the acidity, thereby lessening kidney irritation. By stimulating catharsis and diaphoresis the elimination of toxin is facilitated. Water can be employed with advantage in three different ways: by mouth, balneotherapy and by enteroclysis, a combination of all these methods being productive of the best results. It is my practice to order a definite amount of water to be given with as much regularity as the food. It is best given between feedings. If plain water can not be readily taken use may be made of the various mineral waters as Poland or Celistin's Vichy, or, better yet, it may be exhibited as lemonade or orangeade. To a pint of either of the last two may be added, with advantage, a teaspoonful of cream of tartar.

A daily bath, given with friction, is a valuable adjunct. Aside from being the only means to be employed to reduce temperature, it increases the capillary circulation of the skin and thus relieves the internal congestion. The bath must be given carefully, otherwise serious chilling of the surface will ensue and the purpose for which it was employed will be defeated. For this reason the full tub bath is best, the child enveloped in a blanket being completely immersed. A dry blanket is warmed and held ready to receive the patient when the bath is completed. This is followed by free diaphoresis. If the full tub bath can not be used, it may be replaced by sponging, care being taken to sponge only one part of the body at a time, while the rest of the surface is kept covered. The temperature of the water is regulated by the temperature of the patient. It should never be more than five or ten degrees lower. For young children and infants the warm bath is always desirable. Its effect on the temperature is often amazing and the diaphoretic effect is always beneficient.

Enteroclysis is a valuable prophylactic agent. From one to eight ounces of normal saline solution should be thrown into the rectum to be retained once or twice a day. It lessens thirst, reduces fever, prevents constipation, lessens toxemia and allays renal irritation.

Medicinal.—The only drugs which are of any value in preventing renal complications are alkalies and laxatives. Urinary antiseptics possess little if any controlling influence. The administration of urotropin is useless and expensive. The salts of the organic acids as the citrate or acetate of potassium are changed to alkaline carbonates in the blood and are eliminated as such in the urine. They thus overcome the acidity of the urine, thereby destroying an etiologic factor of some importance. They are given in the dose of five to ten grains. From the beginning of the attack and throughout the course of the disease minute doses of calomel should be given at intervals of every three or four days. These are best followed by broken doses of magnesium sulphate conveniently dispensed as follows:

℞ Magnesii sulphatis	gr. v-x		3-6
Ac. acetici diluti	m. v		3
Syr. zingiberis	m. xx	1	2
Aquæ dest. q. s. ad	℥i	30	

M. Sig.: A teaspoonful every two or three hours in water.

Antitoxin.—As noted before, the specific organism of scarlet fever has not been determined. Of all the organisms found the streptococcus seems to be the one most often present. It is nearly always present in the discharge from an otitis media and has been recovered from the renal tissue. For these reasons it is regarded by some authors as the primal cause of the complications. This view is accepted by Carlton, who, however, regards the presence of the streptococcus as the result of a secondary infection. For this reason he employs Moser's antistreptococcic serum early in the treatment of scarlet fever. Escherich and E. von Leyden comment favorably on the use of this serum for the control of the general symptoms, but assert that it does not influence the occurrence of the complications. Moser himself believes that his serum has a beneficient influence on the grave forms of scarlatina, but that it does not prevent nephritis.

THE FUNCTION OF THERAPEUTIC EXERCISES IN LATERAL CURVATURE.[1]

By Henry O. Feiss,

Cleveland, O.

In the condition called lateral curvature of the spine, it is important to remember that we are dealing, not merely with a local deformity, but with one which implies a general change in shape in the entire torso, and often in parts more distant, so that we must not be tempted to direct our efforts upon the spinal column taken by itself.

It is also important to remember that we are dealing with a non-organic condition in the great majority of cases, a condition brought on, not by disease in the bones, not by disease in the soft parts, but by muscular weakness and insufficiency, or by disproportion between muscular strain and ligamentous maintenance.

The condition usually takes place as a result of faulty position, faulty in being insufficient for purposes of shapely balancing. Then if the position or attitude which was physiological in the start is prolonged so much as to become habitual, lateral curvature results.

At the start habitual cases are usually manifested by long sweeping curves of the spinous processes, with or without a prominent hip, and usually with a slight dorsal convexity on one side of the thorax. It is this developing type in which therapeutic exercises have a most important scope, for such a curve is often the beginning of a more marked and rigid deformity, so that to get hold of these cases early is most satisfactory. We often find that in these early cases mere mental stimulation in enough to bring the torso into symmetry and beauty of contour. If such mental stimulation is sufficient, a few active or passive motions carried out systematically at regular intervals for a certain period of time may indeed be all that is required to divert nature's progress from the pathological path back into the physiological This mental effort cannot be emphasized too strongly, as a person carrying out certain therapeutic exercises with a view to holding himself correctly, will at times, when he is not exercising, unconsciously attempt to hold himself in what he is taught to be the best possible attitude. If the effect of these exercises is to be gotten quickly it implies that the beginning deformity has not come into a fixed stage, that all motion between the vertebrae, which is normal is still present, that ligaments are still firm and of symmetrical strength, and that the muscles are not too far weakened.

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[1] Cleveland Medical Journal.

We come next to a type which represents a stage when distortion has actually begun, and just begun, when the dorsal region of the spinal column, with the thorax attached, has twisted as such upon the underlying torso, and when the long convex sweep has already become fairly permanent, so that even if the patient is reminded to straighten himself up, and taught how, the deformity cannot be quite obliterated. The function of exercises in these cases is a more direct one. Whatever the cause of these cases be, we can always figure on a symmetrical muscular strain, because even if muscular weakness has not been a factor in the etiology, this muscular weakness is bound to come in time, to one side or the other in different sets of muscles, because the origin and insertion points gain different relative positions on the two sides. This, indeed, is rather an unbalancing than a true weakness, and may be regarded as such. The function of exercises here is to make up for the insufficiency by cultivating the individual use of certain muscles or sets of muscles, as well as to bring about a subjective understanding for using these muscles actively, so that the total result is towards a symmetrical balancing of the body. If deformity is at all marked, as in the ribs, or in the column itself, we resort to manipulative methods applying pressure and leverage force in such a way as to counteract the vicious tendencies of nature, using of course, the simplest possible measures.

We next come to a set of cases which may be regarded as less hopeful, but in which radical improvement is still implied, provided the condition is well enough understood, that the separate elements may be analyzed and worked upon with more individual care. We find in these cases a rather marked lateral dorsal curve of the spinous processes, and a sharp posterior rib deformity under the opposite scapula, and over the corresponding hip, which is also prominent. There may be inequality in the length of the legs and sloping of the pelvis. This is only a rough description of a very common type. If we dissected such a torso we should find that the fronts of the bodies of the dorsal vertebræ have rotated towards the side of the convexity of the curve and that the lumbar vertebræ have rotated in the opposite direction, but we need only look at the rib prominence to see how fixed and permanent the pathological anatomy has already become. The principle of dealing with such a case is somewhat different from those in which the prognosis is more favorable, for in these the curves and contours have already affected the shape of the bones to a greater or less degree. We must in the first place assume that asymmetry once begun, the tendency for greater asymmetry becomes proportionately greater. In other words, the fact that the patient is already deformed is usually a pretty good sign that the deformity is going to get worse and that we ought to do everything possible to counteract this tendency. In the second place we ought to understand that even if we cannot mould the patient's back into its original shape we may be able to give it an apparent symmetry which for practical purposes may be all that is required. For example, given a definite and fixed curve in the spinal column we may not be able to obliterate that curve, but we may be able to give a compensatory curve which throws the body into a better balance. We can further by stretching the spinal column with appropriate apparatus bring about a general obliteration of all the curves by doing which we are at the same time stretching many of the muscles and fascia which span an arc of the curve, like the bow-string of a bow.

If we gain a definite amount of flexibility especially in the lumbar region, and it is only in this region that we can hope for much gain, we can often bring about sufficient play to let the rest of the spine assume a more symmetrical attitude. In the dorsal region we can never hope, after the column has become fixed, to regain a great amount of flexibility in toto and our aim is usually to make the lateral curve turn so as to become a posterior convexity.

All force brought to bear upon the rib deformity ought to be exerted with a view of doing everything possible to bring the column itself back into the straight. This not only means a correct application of the force itself, but the correct application of counter force or resistance, because the whole thorax takes part in the deformity and if the resistance is not furnished in the correct relation to the pressure this very resistance may do more harm than the correcting force is doing good. An admirable way to bring about correct pressure is to put the whole body on a stretch and then apply pressure upon the rib deformity, or second, to hyperextend the body and bring the force to bear in that way. In the ribs, the most we can hope for at first by application of pressure is to gain a flexibility which will permit the straightening column to pull correctly upon the convexity in the ribs.

It is not our purpose to go into the details of the application of the various kinds of exercises which may be used. We wish simply to hint at the relation between the function and the application and we may be able to see from this slight sketch that the first function is to cultivate the active forces in the muscles both by mental stimulation and local practice, secondly, to bring into play a certain power of mobility in such joints as have become comparatively fixed by the pathological process, and thirdly, to stretch all factors, which on account of their tightness would interfere with such mobility as we are able to gain.

PNEUMONIA IN CHILDHOOD.[1]

By E. D. Fenner, M. D.

There are three varities of pneumonia seen in the young: 1. Broncho-pneumonia. 2. Lobar pneumonia. 3. Interstitial pneumonia. The first two are very common; the last rather frequent and not often recognized.

Some idea of the frequency of pneumonias in early life may be gotten from the statistics of the New York Infant Asylum, compiled by Holt. During eight years there were 726 autopsies. Of these, 322 were pneumonia cases. They are tabulated as follows:

Pneumonia:

Primary	139
Secondary to acute infectious diseases	112
Complicating other conditions	71

For comparison, gastro-intestinal diseases furnished:

Acute entero-colitis	116
Acute diarrheas, without inflammatory lesions	72
Cases with purely gastric symptoms	0

Jno. Lovett Morse (*Archives of Pediatrics*) reports that at the Children's Hospital, in nine years, there were 1,900 cases of lobar pneumonia, of which fifty were in children in their first year and sixty-eight in the second year. During the same period sixty cases of broncho-pneumonia were treated. In this connection he calls attention to the fact that in all probability many mild broncho-pneumonias were not admitted to the hospital, and that no cases of broncho-pneumonia secondary to the eruptive diseases (and these must have been numerous) were eligible to the wards. This accounts for the relatively small number of broncho-pneumonias in his table.

In regard to the relative frequency of the two ordinary varieties of pneumonia in childhood, we must not be led astray by such statements as "broncho-pneumonia is the pneumonia of childhood." This should be taken to mean that broncho-pneumonias are not the pneumonia of adult life, rather than that it is the only doom to be expected in infancy. In truth lobar pneumonia is very frequent in the young. At the New York Infant Asylum, in children under five years of age, there were 261 cases of broncho-pneumonia, and 109 of the lobar form. Taking the cases occurring in the first two years of life only, 75 per cent. were broncho and 25 per cent. lobar pneumonia.

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[1] New Orleans Med. Jour.

There are some general factors in the etiology of pneumonia in childhood which afford a marked contrast in the two forms of the disease, viz.:

1. *Age* is without doubt a potent factor as a predisposing cause of pneumonia. The anatomical and physiological peculiarities of the respiratory apparatus would lead us to expect a decided influence on the frequency, course and prognosis.

These peculiarities are briefly: The cartilaginous and yielding nature of the ribs; the imperfect development of the muscles of respiration; the relatively large proportion of interstital tissue, and the great area of the bronchial area as compared to the parenchyma or air vesicles; the actual (not relative) smallness of the bronchi, particularly the terminal ones; the loose attachment of the mucous membrane to the underlying bronchial wall and the tortuousness and large size of the blood vessels beneath the membrane, so that congestion readily produces obstruction to the inflow of air to the lobules of the lung. These conditions all tend to interfere with the movement of air in and out, and taken in conjunction with the well known tendency in all inflammatory affections in infancy to *cellular* exudation, are certainly active predisposing causes of the development and spread of pneumonia whenever the bronchi or lungs become congested.

Four hundred and twenty-six cases of broncho-pneumonia examined into by Holt were distributed as follows:

During the first year .... 224 cases or 53 per cent.
During the second year .... 142 cases or 33 per cent.
During the third year .... 46 cases or 11 per cent.
During the fourth year .... 10 cases or 2 per cent.
During the fifth year............ 4 cases or 1 per cent.

Of 500 cases of lobar pneumonia he found:

During the first year 76 cases, or 15 per cent.

From the second to the sixth year 39 cases, or 62 per cent.

From the seventh to the eleventh year 104 cases, or 21 per cent.

From the twelfth to the fourteenth year 11 cases, or 2 per cent.

2. *Sex.* In both lobar and broncho-pneumonia there seems to be a preponderance of males, amounting to 10 per cent.

3. In both types season has an important bearing, about 70 per cent. of the cases occurring during the winter and spring months.

4. The social condition and surroundings of the child are undoubtedly a factor in pneumonia. Bad sanitary conditions, poor feeding, crowding, and careless nursing are responsible for a lowered vitality which must predispose to pneumonia.

5. Exposure to cold and sudden chilling cannot be disregarded in the etiology of pneumonia.

6. And lastly, the micro-organisms, which are the specific cause, must be remembered, although I shall not attempt to discuss their relations to the various forms of pneumonia.

As to the location of the disease in lobar pneumonia, Morse, Holt, and practically all other writers agree that in order of frequency, we have: 1, the left base; 2, the right apex; 3, the right base; 4, the left apex; 5, the right middle lobe.

Morse's table gives: Right upper lobe, 20 cases, or 17 per cent.; right lower lobe, 19 cases, or 16 per cent.; left upper lobe, 16 cases, or 14 per cent.; left lower lobe, 45 cases, or 38 per cent.; right middle lobe, 1 case, or 1 per cent.

It should be remembered that in searching for pneumonia in the young, the region high up in the axilla never should be overlooked. As to the symptoms and diagnosis of pneumonia, important as they are, I shall say little. Frank, typical cases are very easy to recognize. But unfortunately all cases are not of this outspoken type. Many are obscure, with doubtful symptoms and physical signs so obscure as to be almost impossible to distinguish. In this connection, W. P. Northrup (*Chicago Med. Recorder,* November, 1904) says: "Early manifestations sufficing for a diagnosis are: 1, sudden onset, with fever and dopiness; 2, rales; 3, disturbances of the respiration; 4, pulse ratio. Whenever the respiration pulse ratio departs from normal 1-4, and approximates 1-3, keep looking for pneumonia. A better rule in any obscure illness is to keep looking for pneumonia all the time."

The young and inexperienced practitioner is too often led astray by the peculiar puerile respiration of infancy, being deceived by the diminished respiratory murmur over an area of consolidation, and the exaggerated breath sounds on the other side into diagnosing pneumonia in the healthy but overacting lung. Again, the insidious onset of pneumonia in the course of some exhausting disease, such as an entero-colitis, is frequently attended by such slight additional symptoms that it is never suspected till death is at hand.

The mortality of lobar pneumonia is very much lower than that of broncho-pneumonia; the former being generally primary and attacking the robust child, is acute, sthenic, self-limited, and in a large proportion of cases terminates in recovery. Broncho-pneumonia, on the other hand, so much more often a complication of some acute infectious disease, and selecting by preference the feeble and debilitated, is longer in duration and very fatal. I find it difficult to accept the statements of those who "have never lost a case of pneumonia." Such is not the experience of men of the widest experience and highest reputation. It is very certain, however, that the mortality of private cases is very much lower than that of the institutions. It is true of pneumonia and of many other conditions in the babe, that the patient often dies of the hospital after getting over the disease. Hospitalism is a factor well recognized by pediatrists.

When we arrive at the treatment of pneumonia in the young we must admit our resources are not much better than those of our predecessors. From time to time, various remedies have been lauded as specifics, but one by one they have been shown to be useless. Like most other observers, I do not believe that we have any specific which will cut short a pneumonia. Creosotal, in recent years, has been recommended with enthusiasm. Van Zant (*Med. Record*, October 18, 1902) states that "Thirty-seven physicians report 762 cases of all ages (adults and children) and consider that it *sometimes* aborts pneumonia; fifteen report 187 cases and consider that it does not; fifty-seven report 1,022 cases and consider that it renders the course of the disease less severe.

This was at the height of the popularity of creosotal, and today the opinion would be less optimistic. We must not forget, too, that pneumonia sometimes aborts itself. Personally, I must confess that I still cling to the use of creosotal in the hope that it may do some good, but that I feel little real confidence in its powers. The theory that it exerts a remote local action, and disinfects as it is being excreted is so attractive that it is hard to discard it without a sigh of regret.

The treatment of pneumonia, then, is symptomatic. As Jacobi tersely puts it, "the patient is to be treated and not the Greek name of the disease."

Prophylaxis requires that every case of bronchitis should be carefully attended to, lest pneumonia result. Isolation of pneumonia should be practised wherever possible. Heubner, the Professor of Pediatrics at the University of Berlin, is convinced that he has greatly reduced the mortality of pneumonia complicating the infectious diseases by erecting screens of glass between the beds in the infectious wards of the hospital.

The importance of plenty of fresh air cannot be overestimated. Northrup has emphasized this when he said that in the near future he believed that a free flow of air "would be considered one of the most important drugs in pneumonia."

Frequent change of position is important to prevent stagnation of the blood in one part of the lungs. A certain amount of *mothering* is helpful for this and for its effect on the baby's spirits. I have seen quite young infants die of grief and homesickness when placed in an asylum. The care of the digestion and nourishment must be anxious and constant. The only way the excessive combustion can be compensated for in pneumonia is by good absorption. Moreover, the effect of a distended belly is easily seen in the embarrassment of the breathing.

Of the individual symptoms, the fever is the one we are most apt to feel like attacking. Jacobi very wisely remarks that "unfortunately the thermometer alone, ranging from 103 or more, is often permitted to establish indications, and reduction of temperatures appears to become a fad, and the whole duty of many practitioners." Again, "Phenacetin and its congeners have reduced more temperatures than they have saved lives." These are wise words. The temperature of pneumonia does not do much harm unless it is excessive. Long ago I abandoned the use of antipyrin, having seen it produce dyspnea and cyanosis in the hands of others. Phenacetin in small doses, and not too often, not only reduces fever, but quiets the nervous system, and is therefore, sometimes indicated. The fever of pneumonia can be largely let alone when it is moderate in range and is not producing symptoms of nervous disturbance. Where antipyretic measures are needed, hydrotherapy is the best. Water may be used as the bath, by sponging, or in the form of the pack, or cold may be applied in the form of ice bags. Of the latter it may be remarked that infants do not stand the ice bags to the head, in a good many cases being shocked and depressed by its continual application. Of the bath, sponge and pack, sometimes one and sometimes the other is grateful and efficient. The choice must be made after trial. Cold water is indicated when the circulation is active and the heart strong. But when the extremities are cold and the bath is followed by prostration, shivering, and the extremities remain cold, it is contraindicated and should be abandoned. Remember that in these cases, when there is nervous disturbance, a *hot* bath may bring the blood to the surface, and be followed by marked reduction of temperature.

I am quite convinced that local applications are generally useless in pneumonia. Great, soggy poultices, such as we used to employ constantly, weighting down the tired muscles, cannot be comfortable or helpful. Antiphlogistin, I firmly believe does more good to the mother than to the child, and immoblizing the chest by a couple of plaster strips should give more relief to pain and dyspnea than either of them.

Of drugs, digitalis, strychnin, atropin, caffein (or coffee) and alcoholic stimulation are of chief importance. These in proper doses and at suitable intervals will help nature to carry the patient through the danger points. But this paper has already grown to too great length, and their indications are too well known to permit any further elaboration, in spite of the many important points which have not been touched upon. The thing I want to emphasize as strongly as I possibly can, in conclusion, is that nature will cure many cases of pneumonia herself, if she is only given a chance and that the tendency is to interfere too much in this self-limited disease. The nauseating cough syrups we often see poured down the throats of our helpless, but not unresisting, little victims, by irritating the stomach and producing fermentation, not seldom determine a fatal instead of a favorable issue. Let us, then, be watchful to do what is needed, but guard ourselves anxiously against the temptation to do too much in treating the pneumonia of children. "A bitter dose is better than a fine funeral," but a good recovery is better than either.

THE TREATMENT OF CHOREA.[1]

By David Inglis, M. D.

DETROIT.

In the treatment of chorea certain aspects of its pathology seem to be of fundamental importance.

While it is true that, in certain fatal cases, minute capillary hemorrhages have been found, it by no means follows that we are to consider chorea as caused by such minute hemorrhages. On the contrary the fact that chorea occurs so frequently—is so rarely fatal and tends, as a rule, to recovery, even if no treatment is given, would indicate that we are dealing not with organic vascular lesions, but with nutritional disturbances in the cerebral protoplasm.

Again, it is important to note, that chorea is a much more extensive affair than simply a disturbance in the motor field--a defect in co-ordination. The bizarre, and at times severe motions are so striking that they are apt to claim our entire attention. Yet the motor weakness, the impaired muscle tonus are quite as characteristic as the involuntary and erratic motions. But this involves that the trouble is not simply an impairment of co-ordinations, but a general motor defect.

On precisely the same line we note that there is a distinct lowering of emotional control. Emotions are as poorly controlled as are motions. Patients become irritable in the extreme, are moved to tears or silly laughter, are frequently punished for bad conduct, even before the choreic motions are noticed by teacher or parent. Finally there is a corresponding lowering of intellectual ability—of will power—children, with on-coming chorea, often surprise their teachers by a marked decline in their school work.

It all sums itself up in this: Chorea is not a local, particularly motor, defect, but one which involves a general impairment of many and diverse cerebral functions, and this impairment grades from mild to a grave or even fatal degree.

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[1] Detroit Medical Journal.

Now let us consider causation—Rheumatism is probably the most common cause.

It is quite true that acute rheumatic arthritis is a rather uncommon disease in children, nevertheless rheumatism is exceedingly frequent in children. Every case of recurring quinsy is, to my mind, so closely allied to rheumatism that I never see it, but I at once listen for an endocarditis, and it is a most unhappy fact that endocardial murmurs and choreic jerkings are found together with great frequency.

Rheumatism in children very often goes under the title of "Growing pains."

Growing pains! Growth involves no pain—we all know it well enough. Yet we consent to the name, we use it, we let parents go on in a course of blissful neglect and then we are dumbfounded, some time later, to find a young man or woman with organic heart disease, scratch our heads and wonder where it came from and when the endocarditis occurred.

Follow back to a chorea—a quinsy or to a period of "growing pains."

It would appear that the poison of rheumatism, affecting the nervous bodies, does not destroy them but, for a time, greatly impairs them.

Now there are other toxic causes—typhoid, diphtheria, grippe, etc., damp vapors from undrained soil beneath the house, or a damp cellar, auto-intoxication from the bowels. The generally fatal chorea gravidarium is, like puerpal eclampsia, also an intoxication. Some cases seem directly dependent on anemia, however caused. Again it is a case of impaired nutrition of the neuron protoplasm.

Reflex causes of chorea should not be forgotten. They probably act by causing an exhaustion of the cerebral neurons much the same as that of the exhaustion neuroses—removal of cause is obviously needed, but as to treating the chorea, after that, the problem is the same as though the neurons were damaged by some poison or by anemia.

Any successful treatment of chorea must therefore have in view a study of causation and the careful treatment of removable causes. Personally, I wish to emphasize the importance of looking for rheumatic poison, and, if found, treating that.

After trying to correct removable causes comes treatment of the chorea per se.

There are practically two things to be done.

First—Stop waste of nervous energy. It is useless to attempt to fill a barrel with the hose when one has forgotten to put the bung in the bunghole. We cannot get forward in building up the nutrition of the neuron bodies if a constant expenditure be going on—we should try to lessen the jactition of chorea not only because it is disagreeable to look at, but because it means an incessant waste of nerve energy. But we should try, equally, to lessen emotional and mental expenditure. The patient's days should be spent as far as possible in quiet ways. A nagging mother, plaguing children, an irritable nurse, can undo a doctor's best efforts.

So wretched is the atmosphere of some homes that I let a choreic child go to school to enjoy the really more calm atmosphere of school order, although, in general, it is a mistake for a choreic child to attempt the intellectual labor of the school. Calm by day, and sleep, these are the essentials in the stopping of waste. Too much care cannot be given to this matter of sleep.

I make it a routine order that choreics shall go to bed—be in bed, prayers all said and bedclothes tucked in, when the clock strikes eight at the latest—not begin to go to bed, but be in bed.

Another routine rule is to undress the patient, put it in bed in a darkened room for a full hour after the noon meal.

There is generally a fight about this, but unless the woman is a weak sister—a milk and water woman—it can be done. Not a few patients fail to make progress until they are kept in bed all day, in a quiet environment. This sometimes means to bring in a good nurse and keep out emotional mothers and relatives.

As for drugs—Sleep at all hazards, without drugs if possible—with drugs if need be. Chloral is the best, although trional or veronal do very well. Chloral is the surest of all soporifics and children usually bear it well. In the ordinary cases of moderate chorea one soon learns to secure a pretty good long night's sleep.

There are, however, occasionally cases of very grave chorea in which the movements are excessive and violent, the bodily and mental exhaustion profound, and unless something can be done to check it the end is death. In these grave cases the securing not only of some sleep but of much sleep is all important.

I recall a little girl of about ten years, whose condition was bordering on delirium—countenance dusky—feeding almost an impossibility, and I told them that the only hope for the child was to put it asleep and keep it asleep practically all of the time,—that there was a strong probability that the patient might die in any event, but that without sleep, death was certain. I confess that it requires a good deal of courage to give enough chloral to such a child to put it to sleep and hold it to sleep night and day, but the thing was done. The child was roused at frequent intervals to take concentrated liquid nourishment, and spent most of the time night and day for three weeks in sleep. Before the three weeks was up it was evident that the child, instead of growing worse, was gaining some strength, and when the narcotics were gradually withdrawn the child came out and made an excellent recovery. The steady feeding was, of course,, essential.

I have seen a number of such cases, and believe very firmly that no other plan would have saved the child.

This brings me to the second principal problem of treatment,—that of increasing the nutrition of the neuron bodies. It is largely a question of food supply. These patients, as a rule, have little appetite, and it is no easy matter to secure the ingestion of an abundance of nourishing food. Therefore, forced feeding is important. Now, as all the vital functions are at a low ebb, so too, the digestion. It is not enough to give these children three large meals. Even if they eat a large meal, the weakened stomach is liable not to digest it. Well-cooked, nutritious food in small quantities at frequent intervals will accomplish more than attempting to give three large meals.

In considering the question of food in chorea, the part that fats play in cerebral nutrition ought not to be overlooked. Cream, butter, fats of meat, and, if need be, cod liver oil, play a very valuable part. I believe that every neurologist learns to depend upon cod liver oil as much as, if not more than, a specialist in diseases of the lungs.

The problem, however, is not solved when the patient has taken and digested an abundance of food. There is still the problem of stimulating the protoplasm of the cells to take up the food supplies brought to them. Here is where our friend, arsenic, comes in. Arsenic and phosphorus, and probably strychnia, act by stimulating the metabolism of the cell bodies. There is no doubt that some cases respond very quickly to the progressive increasing doses of arsenic, and yet, as a routine treatment, I think it is a mistake. There is such a thing as over-stimulating by arsenic. In so many cases the same poison which damages the neuron bodies impairs also the quality of the blood, so that a certain grade of anemia co-exists in a large number of cases of chorea. Practically, I have found that iron, arsenic and strychnia in moderate doses give better results than heroic doses of arsenic alone. Conservation of bodily warmth deserves attention; it takes a certain amount of bodily energy to keep up bodily heat and many choreics need to save expenditure in this way.

The use of raw eggs is also of benefit partly, no doubt, as one form of fat-containing food, but the lecithin of the yolk does, I believe, act in a manner similar to arsenic as a stimulant to cell metabolism.

SOCIETY PROCEEDINGS

NEW YORK ACADEMY OF MEDICINE.

Section on Pediatrics.

January 11, 1906.

Dr. Matthias Nicholl, Jr., Chairman.

Croup Kettle and Hot Dry Air Apparatus.—Improvements in this apparatus were demonstrated by Dr. T. W. Kilmer.

Enlarged Spleen, With Anemia.—This case was presented by Dr. Eli Long. The patient was a girl of three years, who had always been extremely pale. For two years enlargement of the abdomen had been noted. Frequent examinations of the blood had given almost uniform results, red cells 1,840,000, hemoglobin 20 to 30 per cent., leucocytes 12,000 to 15,000 and very variable in size. There was decided poikilocytosis. Stools and urine were normal, and overfeeding probably accounted for some starchy indigestion. The liver was somewhat enlarged and the spleen markedly so. There was no evidence of intestinal toxemia. The temperature was normal. Primary, progressive anemia had been diagnosed by one physician, but this disease was seldom found in children, and the prolonged course of the disease with improvement under iron, cod-liver oil and oxygen was against the diagnosis. X-ray treatment had been tried, but without results.

Dr. Southworth thought the case more resembled Jaksch's pseudoleukemia than pernicious anemia. Such a case he had known in which improvement was decided under treatment by phosporus and cod-liver oil.

Dr. Hermann said that the condition was found among the Jewish and Italian children particularly in the case of twins, a circumstance which Hutchinson attributed to inadequate supply of iron. The prognosis of the disease itself was not especially serious, but death from some intercurrent disease was very likely. He mentioned that bone marrow had some good results in England, and Dr. Long added that bone marrow had been given to this child since she was in the hospital.

Hypertrophic Stenosis.—This case was reported by Dr. Howland and Dr. Rogers. The patient was a boy nine months old, and had been under observation since the age of five weeks. He was the youngest of three, the others being healthy and nursed for ten months each by the mother. This child at birth weighed nine pounds and seven ounces. He nursed well and gained 13 ounces in three weeks, vomiting seldom. At this point trouble began. Persistent and forcible vomiting occurred either immediately after each feeding or at an interval sometimes of an hour or more. The child suffered from hunger and pain. Soon constipation became obstinate. Numerous measures were adopted which seemed in turn to give promise of relief, but all successively failed. The mother's milk failed and he was given prepared food. Sometimes he went without vomiting for twenty-four hours, but eight hours after feeding the stomach contents could be found with the tube. Pain followed attempts to take food, and he refused to suck after a short trial. The peristaltic waves could be clearly seen. At three months he weighed two and one half pounds less than at birth, and vomited everything ingested.

A gastroenterostomy was done by Dr. John Rogers, with gratifying results. Eight hours after the operation water in half teaspoonful doses was given and the amount gradually increased. Progress was uninterrupted, and in a few weeks he was taking the formula proper for his age, with no digestive disturbances. Dr. Rogers said that the operations for pyloric stenosis were pyloroplasty, gastroenterostomy, divulsion of the pylorus and pylorectomy, the last named being a difficult one. In this case the one chosen seemed to him the only feasible one, and was done without the loop. The absence of adhesions and fat simplified it.

To a question of Dr. Schwarz regarding the chemical examination of the stomach contents Dr. Howland said that free hydrochloric acid was found.

Dr. La Fetra expressed congratulations upon the brilliant results achieved in the operation, the first successful one of its kind in so young a patient.

Replying to the question of Dr. Nicholl, Dr. Rogers said that in gastroenterostomy by suture the prognosis was 62 per cent. with 16 cases; with the button 100 per cent.; in pylorectomy the mortality was 100 per cent.; in pyloroplasty 6 cases gave 50 per cent, and divulsion in 8 cases 25 per cent., making an average mortality of 75 per cent.

Congenital Stridor of the Larynx.—A case of this rare condition was presented by Dr. Sill. The patient was an infant nine weeks old, which emitted a noisy, grunting sound, more particuarly on inspiration. This was supposed to be occasioned by a choreiform spasm of the muscles. Some attributed it to an enlarged thymus, others to abductor paralysis of the laryngeal muscles. No treatment was generally required as most children recovered from it themselves.

Dr. Schwarz said that in three cases seen lately an enlarged thymus was shown in two by the X-ray.

Dr. Southworth mentioned a case recently reported by Dr. Koplik in which the epiglottis was rolled up, but Dr. Sill replied that the bronchoscope had revealed no such rolling up in this case.

Dr. Kerley said that there were clinical differences between cases of this kind and those with enlarged thymus. One of his patients with enlarged thymus had had repeated attacks of stridor with apnea and unconsciousness. Another had thirty attacks. Between attacks there was no stridor. He had seen eight cases, six of which came to autopsy. He thought these cases were due to the abductor paralysis as mentioned rather than to a special nervous influence.

Dr. La Fetra said he never saw a child over a year old with this condition, and thought these cases commoner than was recognized. Laryngismus stridulus and congenital stridor differed widely.

Dr. Kerley mentioned a case in a child sixteen months old.

Chronic Polyarticular Disease.—A paper on the diagnosis and treatment of this disorder was read by Dr. P. W. Nathan. He gave the details of a number of cases, typical of different forms of joint disease and pointed out how these could be distinguished. Infectious osteoarthritis was apt to result in more serious impairment and deformation than primary arthritis, and could be distinguished from the latter by the appearance of early bone swelling, which persisted when the effusion and joint spasm had been caused to subside by placing the joint at rest. Bone destruction was responsible for the deformation. He noted, moreover, than an epiphyseal bone inflammation might exist, without ever penetrating the joint proper, thus remaining an ostitis and not an osteoarthritis. Chronic non-suppurative inflammation of the joints might be occasioned by any one of the infective micro-organisms, and either the number and virulence of these organisms or their location in the synovial membrane or the bone seemed to determine the character of the disease more than the variety of the invading organism. The gonococcus alone showed a pronounced tendency to cause intense infiltration by invasion of the periarticular structures. The pain in this form of infection was so severe as to be almost diagnostic. Although the early stages of primary arthritis and osteoarthritis closely resembled each other, this did not much matter, because at this stage the treatment was the same, being fundamentally perfect rest, preferably secured by a plaster of Paris bandage, and in the latter disorder in most cases the pain promptly yields to this treatment. It was important to distinguish between the osseous and synovial forms. In the former the immobilization should be discontinued as soon as the acute symptoms subsided, and gentle passive motion begun. In the synovial forms, on the other hand, prolonged immobilization was advisable. It was not easy to determine exactly the point at which the patient should be allowed to use the joints.

GOAT'S MILK IN INFANT FEEDING.—This subject was discussed in its bearing on fat problems by Dr. J. F. Bell, of Englewood, N. J. He said that goat's milk fat, like that of human milk, contained less stearin than cow's milk fat, and he had noted that it remained fluid at a much lower temperature. He quoted Pavlov's statement that fat seemed to inhibit the normal activity of the digestion, and suggested that a fat which was not fluid at body temperature might have a greater inhibitory power than one which was fluid. He gave a detailed comparison of cow's and goat's milk, based on experiments, and advocated a thorough trial of the latter, suggesting various advantages which it might be found to possess. He thought that a more intimate knowledge of the chemistry of the fats employed in infant feeding might clear up many mysteries.

EDITORIAL

MILK DEPOTS IN ENGLAND.

Among the various measures advocated in England to combat the high infant mortality which, combining with the low birth rate, has occasioned so much alarm, not by any means ill-founded, on the subject of the dwindling race, the establishment of milk depots has won considerable popularity, and has received support from a number of the medical profession. The idea originated with the French, in the "consultation des nourrisons" at the Charité Hospital in Paris, founded by Budin in 1892. At about the same time another was opened by Variot in connection with the Belleville dispensary. In 1894 Dr. Leon Dafour established the first of the "gouttes de lait" at Fécamp, and there are now more than 90 similar ones in the country. The first in England was that of St. Helen's in Lancashire, opened in 1899. Depots were opened in Liverpool in 1901, in Battersea in 1902, and later in some half dozen other places. They are principally maintained by the muicipalities.

Dr. George Newman has issued a report of the first year of the depot in the Borough of Finsbury. A voluntary committee of medical men, assisted by some lady visitors, have charge of the work. The following principles were laid down: (1) Absolute control of the milk, and the avoidance of the serious fallacy of sterilizing unclean milk; (2) Medical supervision of the entire management of the depot and of the infants using the milk; (3) A discriminating and careful distribution of the milk only to infants who could not be breast fed; (4) The systematic study of the effects of the milk upon the children. It will be noticed that in the effort to individualize the movement as much as possible the Finsbury depot conforms more closely to the French models than do some of its fellow establishments. It is desired to prevent any sense of freedom from responsibility on the part of the mother, while at the same time giving her effective assistance in caring for her child. This individual attention, and the oversight of the milk *from the beginning,* are the characteristic features of the Finsbury experiment. The latter is emphasized again and again, and Dr. Newman justly remarks: "It cannot be too clearly understood that sterilization does not make bad milk good nor dirty milk clean." In the chapter on "Preparation of Milk" stress is laid on "treatment of the milk, whatever it may be, *immediately* after its yield and before the contained micro-organisms have had time to multiply or secrete their products."

Without attempting accurately to estimate the precise value of the milk depots as a factor in the reduction of infant mortality, it is at any rate encouraging to see an awakened general interest in a movement looking in that direction. The danger is, of course, that the public, once seeing something done or attempted as a possible mitigation of untoward conditions, may mistake attempt for accomplishment, and sink complacently back with the reflection: "We have milk depots; the future of the Anglo-Saxon is secure." Against such an apathy the best defense is education of the people in the social and economic problems involved.

CRIMINAL IMBECILES.

In the May issue of PEDIATRICS was discussed the report of Dr. Cronin, of the New York Health Department, in which he sets forth his views as to the necessity of medical supervision for school children, and points out the advantages to be derived from such inspection. The detection of physical and mental defects and their eradication by physical and psychical means was spoken of, but no mention was made of that other class whose physical and intellectual defect is relatively slight, and is overshadowed by moral deficiency. In this day when so much is being accomplished by education of the mentally defective, the epileptic and the physically handicapped, it is perhaps well to call attention to the limitations of the beneficent power of education, as well as to its wide possibilities, foundation though they are for a justifiable optimism.

The 58th Annual Report of the Massachusetts School for the Feeble Minded treats of these moral imbeciles, and notes the difficulty, even danger, of caring for them in an institution with other imbeciles not criminally inclined.

Children belonging to this type should be discovered by such medical inspection and supervision as Dr. Cronin advocates, and the safety of the community dictates that some efficient measures should be devised whereby they should be prevented from swelling the ranks of the professional criminal. They have well-marked characteristics, and almost anyone who reads the description in the report will recognize it as fitting some case in his own experience.

"The history of a case of this sort during infancy and early childhood, is that of an abnormal child. While they generally present definite physical evidences of degeneracy, they are physically superior to the ordinary imbecile. Their school work is not equal to that of normal boys of the same age, but they are often abnormally bright in certain directions. They may be idle, thievish, cruel to animals or smaller children, wantonly and senselessly destructive, and lawless generally. They are often precocious sexually, and after puberty almost always show marked sexual delinquency or perversion. They are often wonderfully shrewd and crafty in carrying out their plans for mischief. They instinctively seek low company, and quickly learn everything that is bad. They have little or no fear of possible consequences in the way of punishment. They acquire a certain spurious keenness and brightness, and possess a fund of general information which is very deceiving on first acquaintance. They are apt to be accomplished liars. The great army of police court chronic criminals, vagrants and low prostitutes is largely recruited from this class of "moral imbeciles." These children are not simply bad and incorrigible, but they are irresponsible by reason of the underlying mental defect. The mental defect and the moral lack are alike the visible effects of incurable affection of the cerebral cortex. No method of training or discipline can fit them to become safe or desirable members of society. They cannot be "placed out" without great moral risk to innocent people. These cases should be recognized at an early age, before they have acquired facility in actual crime, and permanently taken out of the community, to be trained to habits of industry, and as far as possible contribute to their own support under direction and supervision. They are not influenced by the simple system of rewards and deprivations, which easily serves to control the conduct of the feeble-minded. They do not class well with the rather simple types of ordinary imbecility. When the actual number of this dangerously potential class of moral imbeciles is fully realized, they will be given life-long care and supervision in special institutions, combining the educational and developmental methods of a school for the feeble-minded and the industry and security of a modern penal institution. Such provision would only be a rational extension of the principle of the indeterminate sentence, and, if safeguarded by careful and repeated expert examination and observation, could do not injustice and would greatly diminish crime in the immediate future."

ABSTRACTS

Tuberculous Children.—SIR WILLIAM BROADBENT, when recently addressing the council of the Invalid Children's Aid Association, made some very interesting and startling statements regarding the tuberculous children of the metropolis. "It was a remarkable fact," he said, "that whilst consumption had steadily diminished during the last thirty years, there had been no coresponding diminution in the death-rate from other tuberculous affections, which were specially incident to infancy and childhood; on the contrary, they had distinctly increased."

Upon going into the causes tending to produce these evil results and their prevention, Sir. William touched upon several important points. He said: "It was by amelioration of the surroundings that prevention might be favored, that suffering might be alleviated, and in some instances recovery promoted; but recovery must be sought by removal from influences which had brought on the disease. Tuberculosis in children was due to unwholesome nursing, overcrowding, bad ventilation, and to the effects of poverty generally." Coming to the question of the feeding of infants, Sir William passed some very severe strictures regarding it. He declared that "the greatest safeguard against tuberculosis in early life, and against infantile mortality, was that the child should be reared by the mother." The so-called "comforter," or India-rubber teat, constantly seen in the mouths of infants of all classes, he denounced as "an invention of the devil. It was a fraud on the unhappy child, it led to waste of its digestive secretions, and it picked up every kind of filth when it fell on to the floor. If there was consumption in the house, it was the easiest of all ways of conveying the tubercle bacilli to the child."

In conclusion, Sir. William insisted that the great opportunity for successful treatment was in the early stages, and he advocated the sea air and the country in preference to the wards of the best appointed hospitals. A great need exists, in Sir William Broadbent's opinion, for homes where tuberculous children could be received, and given the benefit of open-air treatment, and in this matter he thought we might take a leaf from the book of the French.

Blood Changes in Meningitis in Children.—S. W. CURL (The Lancet, May 6, 1905). Author made an examination of the blood from ten children having meningitis. In nine cases the meningitis was tuberculous. The red cells were found to be relatively abundant in the majority of the cases examined. In six cases, leucocytosis was absent, in two it was well marked. In the last case, counts made at different times yielded widely differing results. In tuberculous meningitis, the eosinophilous cells were almost invariably diminished, with a frequent increase of the large lymphocytes and transition cells.

Lime Salts and Rickets.—REIMERS AND BOYE (Zentralbl. f. inn. Med., Sept. 30, p. 953). Miwa and Stöltzner investigated the effects of a diet poor in lime salts by feeding a puppy 6 weeks old for 55 days with raw horse-flesh, fat, and distilled water. After 3 or 4 weeks the typical symptoms of rickets—enlargement of the epiphyses, curvature of the long bones, and a rickety-rosary—developed. But the anatomical changes were rather those of osteoporosis than rickets. The writers have repeated this experiment on 2 puppies about 10 weeks old. On the eighth day of a diet consisting of raw horse-flesh, pork, or veal, with horse-fat and distilled water, the animals were indisposed to move. This indisposition increased, and any sudden movement was evidently painful and caused the animals to cry out. The gait was waddling, and the anterior limbs assumed the shape of an O and the posterior limbs the shape of an X. The lower ends of the radius and ulna became enlarged. The experiment was continued for 33 days when the animals were killed. There was considerable accumulation of fat. The muscles were normal. The epiphyses of the long bones were enlarged, and there was a rickety-rosary. The long bones when macerated and dried were unusually iight and floated in water (those of a normal dog sink). Their surface was porous and rough. On longitudinal section the compact substance was found to be exceedingly narrow, and the meshes of the spongy substance correspondingly wide. The growing cartilage was moderately widened, and in places there were indications of periosteal changes. But there was no proliferation of the adjacent uncalcified bony layer, and the process was essentially one of osteoporosis. For comparison a puppy with spontaneous rickets was killed. The macroscopic and microscopic appearances were distinct from those due to deficiency of lime, and consisted largely of proliferation of osteoid tissue.

Thus deficiency of lime is not the only factor in the production of true rickets. The writes suggest that the other factor may be heredity, and that children may be especially liable to rickets if both parents have been rickety. That some children are more predisposed to rickets than others is shown by the fact that those brought up on the breast are not always exempt. Siegert's statistics show that in these cases almost without exception the parents—and especially the mothers—had been rickety. Predisposed children do not become rickety unless artificially fed. Rickets were first mentioned in the seventeenth century, coincidentally with an increase in the artificial feeding of infants. It is unknown in countries in which infants are fed exclusively on the breast. Possibly the changes found in the writers' puppies represented an early stage of rickets, which, if the diet had been continued, might have been followed by proliferation of osteoid tissue. This view is supported by the fact that cases of typical rickets in man have been reported in which the changes in the uncalcified layer of osseous tissue were slight and much less marked than those in the cartilage and periosteum.

The Plantar Reflex and Babinski's Phenomenon in One Thousand Infants.—Engstler (Weiner Klin. Wchahrft, No.22, 1905). In the new-born, especially in premature children, dorsal flexion is the almost universal rule, children in the third year of life presenting plantar flexion. In the course of the first and second years, the relative frequency of dorsal flexion, as compared to plantar flexion, decreases with a certain regularity, amounting to about fifty per cent. at the end of the first year. During the period of transition from dorsal flexion to plantar flexion, the reflex is often observed to be absent; and this is the case, comparatively, frequently during the second year. Babinski's sign acquires the significance of a manifestation of disease only after the completion of the second year. Examinations of rachitic children showed their backwardness with reference to the transformation of physiological dorsal flexion to physiological plantar flexion.

Bickel publishes some notes on the above article (Wiener Klin. Wchschrft, No. 27, 1905), in which he states that the explanation for the remarkable observations of Engster, which are supported and supplemented by similar statements from Babinski, Schüler, and others, is based upon the following considerations:

The more the cerebrum predominates in the reflex mechanism, as development progresses, the more the reflex will becomes modified, the originally present dorsal flexion changing to a plantar flexion of the toes. In this connection it is interesting to notice that dorsal flexion may recur under physiological conditions in the adult, when the cerebrum does not functionate, as for instance during sleep. As to the manner of this reflex mechanism, it must be interpreted as constituting a temporary return to the permanent condition of early infancy.

Operative Treatment of the Intracranial Hemorrhages of the New-born.—Cushing (American Journal of Medical

Sciences, Oct., p. 564). Intracranial hemorrhage in the newborn is usually the result of rupture of some vein in the cerebral cortex, in consequence of injury during labor or of strain upon the vessels in the venous stasis of post partum asphyxia. This condition is not difficult of diagnosis and any doubt may be removed by lumbar puncture, for soon after effusion of blood into the subdural space blood corpuscles will be found in the cerebro-spinal fluid. The history of the labor and the degree of asphyxia after birth are important indications. Among the signs is bulging of the fontanelle, which may be so tight as to show no pulsation. In some cases the bulging may be so great that the bony outlines cannot be palpated. Convulsions frequently occur and may be more or less unilateral particularly if they do not appear until several days after birth. There may also be undue reflex activity, the child starting or twitching in a convulsive way in response to any sensory stimulus. Ocular palsies or differences in the size of the pupils are not uncommon, and in severe cases there may be symptoms referable to the medulla, as alterations in the cardiac or respiratory rhythms. In the early days evidence of paralysis is rare. There may be no difference observable in the muscular tone on the two sides of the body, even when the hemorrhage is confined to one hemisphere. The child may die. If it survive it may apparently recover and not for some months may the results of the lesion begin to show themselves. These are spastic palsy, blindness, deafness, feeble-mindedness or even complete amentia, and epilepsy. The writer advocates operative treatment of the hemorrhage, analogous to that adopted in the adult after cranial injuries, in order to prevent the serious permanent consequences. He has operated in 4 cases.

Case 1.—A primipara, aged 35, was delivered of twins after a prolonged labor which was terminated by a low forceps operation in which force was not used. The first child was deeply asphyxiated and did not breathe for some time. It could not suck and had several convulsive seizures. The writer first saw the child on the third day, when it had a peculiar appearance and the fontanelle was tense and did not pulsate. The left eye was kept closed and the pupil was dilated but reacted to light. The pulse-rate was 92, while that of the twin, who was normal, was 110. The respiration was irregular and shallow and was somewhat of the Cheyne-Stokes type with periods of apnea.

Under chloroform a horseshoe-shaped incision was made within, and concentric with, the border of the left parietal bone. An osteoplastic flap, including almost the entire parietal bone, was raised. The dura mater was tense and plum colored. On being opened a clot about 1 cm. thick was found and apparently covered the whole hemisphere. The clot was lifted off the exposed area in large pieces with a blunt instrument and much clot, which extended over the frontal and occipital regions, was washed out with warm saline solution. The wound was closed without drainage. Despite the child's enfeebled condition from want of nourishment during 3 days of life it stood the operation well. Two hours afterward it sucked from a bottle for the first time. Though there seemed every prospect of recovery it died suddenly 8 hours after operation. A necropsy was not allowed.

Case 2.—A tedious labor in a primipara, with breech presentation, was terminated by manual delivery. The child was born in a state of "pallid asphyxia," but after the application of hot and cold water cried vigorously. There was no overlapping of the cranial bones or other signs of injury. The bottle was taken fairly well. On the fifth day the temperature was 101.6° and the pulse was slow (from 80 to 100) without obvious cause. On the sixth day there were 5 attacks of convulsions of varying type and increasing severity. In the more severe ones twitching was most marked in the right arm and leg. Some of the convulsions were confined to the face and head. On the seventh day there were 11 seizures, most of which were bilateral, but some of which seemed to be most marked on the left side. There was constant inequality of the pupils, the left being dilated and the right contracted, except during the attack, when both were widely dilated. The fontanelle bulged slightly but not so much as in the preceding case. On the morning of the eighth day there were 7 seizures which were more marked than before and sometimes accompanied by cyanosis.

The right parietal bone was turned down with the overlying parts in the manner described in Case 1. The dura mater was somewhat tense and though not plum colored showed an underlying extravasation. On being opened free blood and small clots were found and were washed away with warm saline solution. The wound was closed without drainage. The child slept for 2 hours and when it awoke cried vigorously and took milk eagerly. The convulsions ceased and recovery ensued. A year later the child was reported to be a fine baby and beginning to speak.

Case 3.—A girl, born on Oct. 3, after a difficult labor lasting 48 hours which was terminated in a low forceps operation, was seen in consultation with Prof. Whitridge William, on Oct. 11, 1904. She was profoundly asphyxiated and respiration was established with difficulty. On the second day the right eyelids began to swell and the surrounding tissues were edematous. On the third day extreme proptosis of the right eye developed in a few hours. For several days the child suckled fairly well. Then it would not do so and nursing had to be discontinuel. She became dull and stupid and would not swallow nourishment placed in the mouth. The respiration was very irregular and on the 10th became of the Cheyne-Stokes character and there were restlessness and convulsive movements of the arms and legs. Twitching, particularly of of the right hand, and rigidity of the legs were also observed. The pulse was often below 100 and the fontanelle was very tense. On the 11th, when the child was first seen by the writer it hardly seemed possible that she would survive. There was extraordinary protrusion of the right eyeball with corneal opacity and hemorrhagic edema of the lids and conjunctiva. The fontanelle was bulging and so tense that its bony margins coud not be made out. The pulse was very irregular in rhythm and quality. The respiration was irrregular, with long periods of apnea. There seemed little question as to the presence of an intra-cranial hemorrhage, though considerable doubt existed as to its situation. The history of a sudden non-pulsating protrusion of the eyeball, with great edema of the lids and conjunctiva—a condition rarely if ever met with except after cavernous sinus thrombosis—pointed to a basal fracture with laceration of this vessel, which had not thrombosed and produced proptosis until the third day. It seemed both to Prof. Williams and to the writer that craniotomy offered the only hope of recovery.

On Oct. 12 an osteoplastic flap, including most of the parietal bone, was elevated upon the right side. The dura was extraordinarily tense, and, in the endeavor to reflect it by an incision concentric with the osteoplastic flap, some cortical injuries were unavoidably inflicted owing to the great cerebral tension, which caused the brain immediately to bulge into the small primary opening. The protrusion was so extreme, and the soft, jelly-like infant's brain so easily lacerable, that it was impossible to elevate the temporal lobe sufficiently to discover whether or not a clot was present at the base as a result of the presumed lesion in the cavernous sinus. Nothing more could be done than washing from the cortex the numerous old blood clots on the exposed surface, as well as those which could be liberated from below, by such slight dislocations of the hemisphere as was possible without causing further cortical lacerations. With the removal of these clots and the escape of cerebro-spinal fluid, the bulging, though still considerable, diminished to such an extent that the dura could be brought together again by sutures. The fear the tension was sufficient to break down these sutures and lead to a hernia cerebri, or, worse, to a fungus, seemed to justify similar exposure of the other hemisphere. Consequently, a parietal flap was turned down in like fashion on the left side, and a similar procedure carried out, with washing away of numerous blood clots and the escape of cerebro-spinal fluid. This diminished the tension so much that the fontanelle became depressed, and the brain no longer tended to protrude through dural openings. These were carefully approximated by sutures, the bone-flaps were replaced and the scalp wounds were closed without drainage. The child, contrary to expectations, immediately began to improve. By the following day nourishment was well taken from a bottle and she began progressively to put on weight. Both wounds healed by primary union. It became evident after a few weeks that the cavernous sinus was becoming channelled. Ultimately, the circulation from the eyeball became re-established, and the exophthalmos gradually disappeared. Probably, however, the eye is completely blind. The child is developing and appears normal, but what its mental status will be cannot yet be said.

Case 4.—The condition of the child was also unfavorable, and a large clot was removed. Death occurred during operation.

The writer concludes, contrary to the text-books, that a newly born child will stand a cranial operation well if there is proper regard for hemostasis and avoidance of exposure to cold. It is noteworthy that in 3 of the cases the hemorrhage was unilateral and that in 2 cerebral symptoms were not observed until several days after birth. A more careful study of the symptomatology, which will, no doubt, follow the knowledge that something can be done in these cases, will perhaps enable them to be recognized earlier. The writer believes that in many cases the immediate risk of death and the grave late consequences of these hemorrhages may be avoided by operation.

Bilateral Birth Paralysis of the Lower Arm Type.—J. J. Thomas (Boston Med. and Surg. Jour., Oct. 19, p. 431). Paralysis in the child after difficult labor is generally of the upper arm type. Occasionally paralysis of the lower arm is seen but it usually is the remains of a total paralysis of the arm. Bilateral paralysis of the lower arm type is very rare. A boy, aged 7 months, was seen on Dec. 7, 1902. He was born after difficult labor, in which the face presented with the chin posterior. Under chloroform an attempt was made to flex the head but failed. Traction with the forceps also failed; so did an attempt at version, in consequence of contraction of the uterus. During the latter attempt, however, the head was pushed back a little and with difficulty the presentation was converted into a cranial one. The labor then proceeded normally, but on delivery paralysis of the arm was observed.

The forearms tapered to the wrists, probably from muscular atrophy, and the hands hung flaccidly, the wrist-joints being lax. The arms were held abducted almost at right angles with body. The forearms were held flexed on the arms and passive extension at the elbow was resisted. The only voluntary movement of the upper limbs semed to be an elevation of the arms and flexion of the forearms.

On Feb. 4, 1903, there were slight movements in all the fingers of the left hand except the middle finger, and movements in the thumb and index finger of the right hand. The hands were held extended and deviated towards the ulnar side; the fingers were extended at the proximal phalanges and flexed at the terminal ones. There was well-marked atrophy of the muscles of the forearms, especially of the flexors, and of the muscles the thenar and hypothenar eminence. The biceps, deltoid, and supinator longus of both arms responded well to faradism, while the triceps and all the muscles of the forearms gave no response.

In May, 1905, the paralysis persisted except that the grasp was stronger, which seemed to be due to recovery of power in the long flexors.

The writer has observed similar cases, and one has been reported by Jolly. The writer thinks that the lesion was chiefly of the seventh cervical root, and that the eighth and first dorsal roots were also involved, though in none of the cases were there symptoms of injury of the sympathetic fibres in the latter root. In all three cases the face or chin presented. This confirms Jolly's view that the injury was due to stretching of the nerve roots from over-extension of the head. Either directly by the stretching or by pressure of the clavicle against the first rib, the lower part of the brachial plexus must have been injured, but far enough from the spinal cord for the ocular fibres of the sympathetic in the first dorsal root to escape.

The After-Treatment of Diphtheria.—White (Journal of the American Medical Association, Oct. 21, 1905), tells us that the after-treatment of this disease consists in a sufficient period of rest in bed, and then in watching the effect of mild exercise on the heart, for several months at least, and grading it to meet individual requirements. Tonic drugs, such as strychnine and iron, are occasionally useful. How rigidly the rest cure must be enforced depends entirely on the individual case. It was found last year in a study of cases in the hospital that it was not necessary to keep all patients in bed who had cardiac murmurs and a pulse which was slightly irregular and somewhat increased in rate. After four or five weeks of rest in bed in cases of moderate severity, the patients experienced no ill effects from being allowed to sit up for short and progressively longer intervals, if the heart was carefully watched; frequently the heart's action seemed to be improved by this change.

It has also been the case that in many mild cases the patients after leaving the hospital with murmurs and slight cardiac enlargement and irregularity became entirely well in a month or two without special care. The writer believes it would be a mistake invariably to keep these children at home and put them to bed, but overexertion should be carefully guarded against.

The writer also believes that much of the cardiac dilatation which was often seen in the first few weeks after leaving the hospital could have been avoided by more intelligent restraint of these children at home. Even the milder cases should be carefully watched, and whatever causes shortness of breath, pallor or fatigue, or affects the heart unfavorably by notably increasing the pulse rate, causing irregularity or any increase in the cardiac area, should at once be stopped, whether it consists of running, walking, playing, or even in simply being out of bed. The heart must be given abundant opportunity to rest and recover its normal function. This is the only conservative treatment and the only way to avoid permanent damage to the heart in some instances. All the severe cases require rest in bed and careful watching of the heart for months or years afterward. White concludes that: 1. The cardiac disturbance after diphtheria usually presents the picture of a mitral insufficiency with irregular heart action and few symptoms. Occasional cases have rapid pulse or cardiac irregularity without any other signs. 2. Moderate disturbance of the heart is very common after diphtheria, and in a large number of cases persists from two to six months after the original illness. 3. In many cases the cardiac lesion does not clear up in the first half year, but lasts much longer; some ultimately recover; others probably do not. The duration of the heart trouble is usually in proportion to the severity of the original illness. 4. The fact that children often have few heart symptoms after diphtheria must not mislead us as to the importance of the injury to the heart. 5. Cardiac disturbance of long duration following diphtheria may be entirely recovered from. It is not necessary to give up hope of recovery in individual long cases. 6. The treatment of this condition consists in a sufficient period of rest in bed, and then in watching the effects of mild exercise on the heart for several months at least and grading it to meet individual requirements.

The Treatment of Pneumonia in Children.—Acker (American Journal of Obstetrics, Oct. 1905). A patient with pneumonia, as those suffering from other diseases of the lungs, should have a large amount of fresh air. Many (this includes some physicians) appear to consider it a sin to allow any fresh air in the sick-room, but think that the little one must be kept in a hot, close room with woolen goods or cotton jacket about the chest. In a case in which the author was a consultant last winter, the infant was in a room 15 by 17 feet. There were four persons present, and a large gas stove helped to heat the room. The temperature was about 80° F. and the windows were closed. The little patient was enveloped in heavy clothing. There was marked respiratory dyspnea and cyanosis. The child was dying for want of fresh air. The physician in charge was a capable man, and he explained to the author that it was impossible to get the parents to observe the proper hygienic measures.

The diet is of the greatest importance, for the digestive organs must be kept in good condition. If the temperature of the child is high, sponging with cool or tepid water will allay the nervous symptoms and promote rest. Small doses of the sweet spirit of nitre or solution of acetate of ammonia (if neutral) will have a good effect on the fever, but the coal-tar preparation must not be used for this purpose. Expectorant medicines are not of any, or are of little, value in the disease, and often impair the digestion. The carbonate of ammonium and aromatic spirits of ammonia are at times useful as respiratory stimulants. Alcohol and strychnine will be necessary in many cases when the vital forces are on the wane. If the cough is harsh and dry, the air should be kept in a moist state, and the croup kettle (with compound tincture of benzoin in the water) is admirable for this purpose. Unless the cough is very troublesome it does not require treatment, and certainly one must be cautious in the use of opium, for if given to relieve cough it interferes with the secretions and embarrasses the respiration. It is necessary for the patient to cough to remove the mucus from the bronchial tubes. A teaspoonful of hot water will often have the effect of quieting the cough. A mild mustard plaster is often of service. The chest can be rubbed with camphorated oil or Roche's embrocation, this latter being a favorite application with the author. It is a fad at the present time to apply clay preparations to all the ailments of the body; but as the author has observed blisters produced by the application of one of these on several infants he warns against their use—he has never noted any good from them in cases of pneumonia.

The heart's action and the skin must be watched, and if the former shows any signs of fatigue or the latter any cyanosis, increased stimulation must be resorted to and warm mustard baths and dry cups may be employed.

Beverly Robinson, who has paid considerable attention to the prevention of pneumonia, has observed that the micrococcus lanceolatus is one of the least tenacious of life among the pathogenic microörganisms, and that it does not thrive in an acid medium; therefore he recommends the frequent use of acid mouth washes in times when the disease is prevailing. The sputum, stools, and urine of the patient should be destroyed, and the mouth washed frequently with an antiseptic solution. The antipneumococcic sera have not been found to have any marked benefit, though some have thought that there has been a slight reduction in the mortality shown. Even those who have given the serum in large doses have not been able to report any great success. One of the prime factors in the treatment of pneumonia is to watch the condition of the stomach and bowels, for in nearly every case there is great disturbance of these organs. The food must be such as will easily digest and cause no fermentation. If the stomach and bowels keep in good condition, the battle is half won. Milk should be diluted and not given in too large quantity at a time. The child should be fed at regular intervals, and plenty of good water given. The bowels should be opened at the commencement of the disease with castor oil or calomel, and afterward kept open by enemata.

A Consideration of the Etiology and Dietetic Treatment of Infantile Atrophy.—WENTWORTH (Journ. of the American Medical Association, August 26th, 1905). Infantile atrophy is usually produced by a combination of errors in feeding. The way in which a faulty diet leads up to a condition of atrophy is still unknown. Nothnagel and Baginsky supported the view that a constant derangement of digestion caused atrophy of the intestines. Heubner and, later, Block disputed this theory, and after careful investigations the latter came to the conclusion that the only change was that in Paneth's cells in Lieberkuhn's ducts. These cells did not contain the granules which are supposed to be evidence of their functional activity. The strongest evidence against intestinal atrophy being present is the rapidity with which the infant gains weight when a suitable food is given. It is inconceivable that the repair of a serious structural lesion can occur so rapidly and so completely. Probably impaired intestinal functions are of chief importance in producing the atrophic condition. The chronic intoxication theory is not proved. Czerny stated that an excess of cow's milk proteid might produce an acid intoxication, which would impair the functions of the liver.

Keller and Van der Bergh also supported this view. Pfaundler, however, disproved this theory, and came to the conclusion that a physiological hyperacidity is present in the tissues of artificially-fed infants whose food contains an excess of fat. His experiments on the amount of ammonia in the urine went to show that there was not an acid intoxication. The feeding with breast milk restores the function very quickly, and possibly there are some ferments, which stimulate digestion, present in breast milk. The digestion is less adaptable if these ferments are absent and gastro-intestinal atrophy is more readily produced. As regards feeding, three courses are open, viz., the proprietary foods, cow's milk mixtures and human breast milk. The proprietary foods are generally unsuitable, because they do not seem to conform to any rules, and are very often the cause of rickets and scurvy. Frequently there is a temporary improvement with each new food tried. Cow's milk mixtures are better, but they, too, are usually unsuitable. In the case of atrophic infants more energy is expended in the act of digestion, and more calories in the food per kilo weight are needed to balance this extra expenditure of energy. This is shown by clinical experience as these children do best on a mixture in which the percentages of proteid and fat are low and the percentage of carbohydrates is high. The fact that these infants absorb carbohydrates well explains to a great extent the good done by condensed milk or the proprietary foods. The cow's milk mixture must be given regularly and at frequent intervals. The human breast milk is by far the most reliable food in the writer's experience. The difficulties are not so great as they are generally considered to be, and the improvement is often so marked that even a temporary change to breast milk will enable the infant to regain enough digestive power to allow it to thrive on a cow's milk mixture.

Metadiphtheritic Scarlatinoid.—MARFAN (Le Presse Médicale, 1905, p. 265). In diphtheria treated by serum a scarlatiniform erythema is met with more frequently in the cases with severe or moderately severe angina than with those having mild anginal symptoms or croup. The erythema supervenes usually from the eighth to the twelfth day after the first injection, though its period of occurrence is not fixed. It comes out over the body generally, sparing the face, and is accompanied by slight fever and other symptoms of acute illness, often ushered in by vomiting. There is almost always an accompanying redness and swelling of tonsils, with pultaceous secretion in some instances, and swelling of the superficial lymphatic glands in the neck, axillae and groins. It is to the above syndrome that Dr. Marfan gives the name of "le Scarlatinoïde Métadiphtérique," and the question arises, what is its real nature? He points out that it is not due to the serum, since one never meets with it in healthy people who have received an injection, and concludes that it must be an associated or secondary infection, viz., either a streptococcal or diplostreptococcal infection, or a true scarlatina modified by the antecedent diphtheria and the serum treatment. He believes that the latter is the real explanation.

On a Case of Progressive Paralysis in Childhood.—Woltar (Prager med. Wochenschr., September, 1905, No. 39. The patient first began to show signs of degeneration at six years of age, being unable to keep pace with his school-fellows of the same age. He learned to read, write and count with difficulty, and at twelve years old was so backward and showed such obvious signs of mental deficiency that he was sent to an idiot asylum. He appeared to have the development of a child of five years of age; he could not spell, he could not put a sentence together; he was dirty, and his gait was feeble; his knee-jerks increased, and his plantar reflexes definitely of the extensor type. He rapidly got worse, became speechless, only uttering unintelligible cries, and after several attacks of convulsions, died about a year after his entry into the idiot asylum. Woltar recounts the post-mortem findings, which were, briefly, a chronic meningitis with an atrophy of the cortical gray matter, and an atrophy of the pyramidal tracts. He mentions a few of the cases previously recorded, and notes the fact that syphilis plays the chief part in the production of the condition. In the present case, however, there was no evidence of a syphilitic infection.

Convulsions in Children.—Cautley (Clinical Journal, September 6th, 1905). Cautley states that an essential factor is an imperfectly developed or an enfeebled condition of the nervous system, and thus all disorders of nutrition and all causes leading to malnutrition result in the persistence of, or a return to, the infantile condition of the nervous system with its imperfect control over the lower centers, thus predisposing the child to convulsions. A long account of the etiology of the condition is given, in which he states that the more carefully fits are investigated in infancy the rarer is diagnosis of idiopathic origin made. He agrees with most other observers that the predisposing causes are more important than the exciting. As regards the effect of heredity, the author writes: "Every year I become more and more convinced that heredity has extremely little influence per se during the first three years of life, and that marked family predisposition is very infrequent in such cases." He considers the association of fits with a rachitic condition of the body has been unduly emphasized, and that the true explanation of the fit must be looked for in the dietetic and other conditions which have given rise to rickets, and not to rickets itself. As regards convulsions at the onset of the infectious fevers, he considers these are not common, and often occur in children who have already had fits or who are predisposed. As regards gastro-intestinal disturbances as a factor in convulsions, Cautley thinks that the effect is probably often not from the reflex irritation of the food, but from the absorption of some toxin produced in the food in the process of digestion. The author states that convulsions may be the first indication of true epilepsy, and the older the child the greater is the probability of this being so.

The Local Action of Anti-Diphtheritic Serum.—Dopter (Gazette des Hôpitaux, 1905, p. 459). In 1903 M. Martin published the results of his experiments with the local application of anti-diphtheritic serum, in the liquid state, in cases where the diphtheria bacillus was retained for an unusual length of time upon the mucous membrane. Apparently under these circumstances its action could not be sufficiently prolonged, and much greater benefits were obtained by the use of dried anti-microbic, not anti-toxic, serum, incorporated in gum, and given in the form of pastilles. Dr. Dopter has tried these pastilles in 72 cases, and concludes that they ensure the disappearance of the bacillus in five days at the latest, whilst relapses are rare. The pastilles must be sucked, twelve being taken daily, that is, one every hour, and no gargle or lotion must be used. He also tried the dried serum in powdered form as a snuff in cases of diphtheretic rhinitis, and though the results were less marked than in the anginal attacks, yet he thinks there was a diminution in the time of retention of the bacillus by the nasal passages.

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ORIGINAL ARTICLES

THE FEEDING OF INFANTS[1]

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Mr. President and Gentlemen —When our secretaries asked me to read a paper before this Society I naturally turned to the subject of children, the study of which, I think, is too often neglected in a general hospital.

My subject is "Infant Feeding," and I have selected it as being the fundamental principle in the treatment of infants. The ailments of by far the majority of infants are gastro-intestinal, and of these the greater number are due to improper feeding. Now, of course, everyone here knows that maternal nursing is the natural and ideal method of feeding infants during the first months of life. Unfortunately from social reasons or from the necessity for working, an artificial is often substituted for a natural diet from the very first. It should be our aim, therefore, to impress upon mothers the desirability of breast-feeding, and where this is possible four nursings should be given in the first twenty-four hours,[2] six during the seoond day and after that ten a day till the end of the fourth week. You will remember that at birth the capacity of an infant's stomach is only 1 oz., and that it increases rapidly, till at two weeks it is two oz., at three months 4½ oz., and at the end of a year 9 oz. You will also recollect that lactation in a mother is not fully established till about the third day. From this you will see that Nature enjoins that the amount of food to be given during the first forty-eight hours of life should be small, and this is not surprising considering the changes that are taking place in the circulation and the respiratory system. After the fourth week the breast should be given according to

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[1] Read before the Hunterian Society of St. George's Hospital.

[2] Some authorities advise not more than two or three nursings during the first twenty-four hours.

Table I.—Schedule for Breast Feeding.

Age	Number of nursings in 24 hours	Interval during the day	Night nursings 9 p.m. —7 a.m.
1 day	4	6 hours	1
2 days	6	4 hours	1
3—28 days	10	2 hours	2
1—3 months	8	2½ hours	1
3—5 months	7	3 hours	1
5—12 months	6	3 hours	0

Now, it is absolutely essential that the details here given should be strictly carried out, and that the child should not be put to the breast whenever the mother "thinks it wants it," or whenever it cries. An infant's stomach requires periods of rest the same as an adult's, and if it is fed too often there is a gastro-intestinal upset. Children, if managed properly, can easily be trained to sleep with regularity, and a healthy child will have at least one sleep of four to five hours in the twenty-four. Hence it is advisable to wake the child during the day for his two-hourly feeds, in order that he may sleep better during the night, and only wake for his one or two nursings. In this way the mother is less disturbed and has a chance of regaining her strength.

In addition to these details of breast-feeding the care of the mother's breasts must be attended to, and this is a point which is too often neglected by the poor. Scrupulous cleanliness is absolutely necessary, and the whole of the breasts as well as the nipple should be carefuly washed after each nursing. Plain water is perhaps sufficient, or a weak boric lotion may be employed. The health of the mother too is of the utmost importance, and must be attended to as occasion arises, for on this depends a good supply of milk. In this connection a good night's rest is perhaps of as much importance as anything else. Hence the great necessity for training the child to sleep at night, as I have just told you, and, moreover, for enjoining that night-feeding should be stopped after the fifth month (see

Table I). Then on no account should the child be allowed to sleep on the mother's breast, nor even in the same bed. The temptation to frequent feeding at night is thus largely removed, to say nothing of other dangers, such as overlying.

Next we must consider how long the child should be kept at the breast. You may take it that nine months is the proper time for solely breast-feeding. After that the child should be gradually weaned, an increasing number of bottle feeds being substituted for the breast, until at the end of eleven months or a year the child is on a purely artificial diet. This method of procedure is in the interests of both the mother and the child. The mother is saved from the necessity of the breast-pump and other artificial means of stopping the secretion, and lactation gradually ceases, while the child is saved from an abrupt change of diet, which ofttimes causes acute indigestion or is refused, until a serious condition of starvation is arrived at. The bottle feeds, I need hardly say, should consist of diluted cow's milk. The amounts of dilution I shall touch upon presently, when speaking of artificial feeding, but one point in the weaning of infants must be borne in mind, and that is, that the dilution of the milk must be greater than that required by an artificially fed child of the same age. This is especially the case in sudden weaning, when an infant weaned at the ninth or tenth month should be given to begin with bottle food appropriate for one of the third or fourth month, and similarly one weaned at six months a food appropriate for a child of one month, and so forth. When the child is accustomed to the cow's milk its strength can be gradually increased. Weaning in hot weather is usually to be avoided unless one can be sure of the freshness and purity of the milk supply, but the dangers from this are scarcely so great as when lactation is unduly prolonged. The importance of weaning a child after nine months is great, for soon after that time it requires a more varied diet, and if it does not get it, dire results follow. In my experience at a children's hospital breast-feeding continued for more than a year—and often one finds it continued for eighteen months or even two years—without any other dietary is an important factor in the causation of rickets. Thus out of a series of 200 well-marked cases of rickets which have recently come up to my Out-Patient Department I find that 83, or 41.5 per cent., were kept at the breast too long.

This prolonged breast feeding is generally the fault of the mother; it may be the result of slackness—the child is going on tolerably well and she does not take the trouble to change its food—or it may be from the popular idea that as long as lactation is continued another conception will not take place.

Now, under certain circumstances artificial feeding must of necessity form part of the dietary, and this is termed mixed feeding. The necessity for this generally lies with the mother: it may be that her supply of milk is naturally deficient or defective in quality, or if at any time her health begins to suffer, she should be relieved of two or more nursings a day and the bottle substituted. She may thus be enabled to continue lactation for some time longer. When, however, the nursings have been reduced to two or three a day the milk should be frequently examined, as its quality is apt to deteriorate. Retarded convalescence after parturition, again, may cause the mother's milk to be insufficient until she is well enough to be out and about, in which case two or three bottle feeds a day will tide the child over until he can receive sufficient of his natural food. In all these cases the bottle feeds should be the same as when the child is fed entirely artificially.

Other circumstances, again, render it imperative that breast feeding should not be allowed from the first. No mother who has tuberculosis in any form, whether latent or active, should nurse her child; it may hasten or re-start into activity the disease of the parent, and it exposes the infant to a danger of infection. Any serious complication connected with parturition is another reason. Among such I may mention severe hemorrhage, nephritis, convulsions, septicemia. Again, when the mother suffers from any chronic disease, nursing will only debilitate her and not correspondingly benefit the child.

In such cases we have to choose between wet-nursing and artificial feeding pure and simple. As you may suppose, the difficulties attending the engagement of a good wet-nurse are many. There is, first of all, the expense, and then the difficulty in obtaining a suitable woman free from all suspicion of disease. These considerations, of course, render the employment of a wet-nurse by the poorer members of the community out of the question, but if they can be successfully overcome in the case of the well-to-do, a wet-nurse is undoubtedly of the greatest service, and this is especially the case where we have to deal with premature infants and those with feeble powers of assimilation, who from chronic indigestion fail to thrive on artificial food. In the majority of instances, however, we have to resort to artificial feeding.

Before giving the details of artificial feeding, it is necessary to compare human and cow's milk, for cow's is, practically speaking, the only available for common use.

Table II.—Comparison of Human with Cow's and Other Milk.

	Hum'n milk	Fresh cow's milk	Con'd cow's milk	Ass's milk	Goat's milk	Mare's milk
Proteids—Total	1.5%	3.5 %	14%	2.7%	3.8%	2.2%
Lactalbumen	.8%	.5 %	——	——	——	——
Casein	.7%	3. %	——	——	——	——
Sugar . . .	6—7%	4—5%	49%	5.3%	4.3%	5.8%
Fat	4. %	4. %	10%	1. %	5.2%	1.1%
Salts	.2%	.75%	2%	.4%	.7%	.3%
Water . . .	87.3%	87.25%	25%	90.6%	86. %	90.6%

From the table it will be seen that the proportions of the constituents are not the same in cow's as in human milk. You will observe that in cow's milk there is excess of proteids and salts and too little sugar, the quantity of fat being the same. The cow's milk must therefore be modified to suit the requirements of the infant as far as may be.

Now, there is more than twice as much proteid in cow's milk as in human milk, and of the total proteids casein forms by far the greater amount. Proteids, especially the casein, are the most difficult part to digest, and on this account it is necessary to dilute the milk for young infants. The proportion of fat must be made up by adding cream, which on an average contains 20 per cent. of fat, and that of the sugar by adding lactose or ordinary cane-sugar. There is also another reason for diluting the milk, and that is the dense coagulum which forms in the stomach when feeding with cow's milk. This is considerably lessened by dilution, but does not disappear entirely even when the total proteids are made the same as in woman's milk.

The proteids may be modified in one of five ways: either (1) by reducing the proportion by the addition of water; (2) by peptonizing; (3) by separating them after the coagulation of the casein with rennet; (4) by diluting with gruels made of barley, oatmeal, etc., for their mechanical effect upon the coagulation of the casein; or (5) by the addition of sodium citrate. For the healthy infant reduction of the proportion of the proteids is all that is required, but during the early months, until the stomach is accustomed to the cow's milk, a reduction beyond 1.5 per cent. is advisable, even down to 0.5 per cent. The strength can be gradually increased until at the end of the second or third month 1.5 per cent. can be given, and by the end of the fourth or fifth month 2 per cent. The full proportion of proteids in cow's milk can seldom be given before the child is a year old.

The salts in cow's milk are in excess in about the same proportion as the proteids, so that the necessary dilution is the same for both. This constituent, therefore, can be left out of our calculations.

The sugar in cow's milk is about 2 per cent. less than in human milk, so that to raise it to the proportion required is a very simple matter. Thus if lactose be added, ʒj is equivalent to 2 per cent. in 7 oz. of milk, and in artificial feeding the carbohydrate should be kept at about the normal proportion. Lactose is the best sugar to use both theoretically and practically. It should be dissolved in boiling water and filtered, if necessary, and should be prepared fresh every day, at all events in summer. Failing this, cane-sugar may be substituted, but in only little more than half the quantity, as it is sweeter and more liable to undergo fermentation in the stomach. This is especially the case with brown sugar, but, on the other hand, the brown in some cases has the advantage over white in that it is more laxative.

With regard to the *fat*, except for the first few days of life, an infant can digest from 2 to 4 per cent.—2 per cent. at the end of the first week, and 4 per cent. at four or five months. Any deficiency in the fat in diluted cow's milk must therefore be made good, and this is done by the addition of cream.

The *acidity* which occurs in cow's milk on being kept even for a short time may be overcome by the addition of either lime-water or bicarbonate of soda to the milk—of the lime-water about 1 oz. to 20 oz. of food; of the soda about 1 gr. to the ounce.

Having thus considered the composition of milk generally, I shall next deal more in detail with the preparation of the infant's food, which shall be suitable to its age. For the *first three or four months* of life it is desirable that the amount of fat should be three times that of the proteids—*i. e.,* about the usual ratio in breast milk. The best way to obtain this is to get a milk containing 10 per cent. of fat and 3 per cent. of proteid, and to dilute it. Now, 10 per cent. fat and 3 per cent. proteid is found in "top-milk," as it is called. Good milk fresh from the cow is allowed to stand in a cool place for four hours, and the upper third of the milk is then siphoned or baled off. Begin at birth with 2 oz., of this top-milk, 1 oz. of lactose, and 1 oz. of lime-water, diluted with water up to 20 oz. The proportion of the milk can then be increased ounce by ounce till 4 oz. in 20 are used at the end of a week, and 6 oz. or 7 oz. in 20 at the end of three or four months.

Now, of course all this is ideal, and the mothers of hospital patients have not the time, the intelligence, or the money to carry out ideal feeding, but I hope that all of you will have patients possessing these attributes, and then the value of these things will be apparent. Therefore, as the mothers of hospital patients cannot or will not, carry out an ideal method, it behooves us to see how we can best make use of the materials that we have—*i. e.,* a stupid mother and ordinary cow's milk—and in passing let me add that I do not believe that a rigid adherence to figures is absolutely necessary for the proper nutrition of an infant. The majority do perfectly well on the approximate proportions that I am going to give you, though of course there are instances in which one or other of the constituents of the milk must be increased or diminished. You will remember that I am still dealing with children during the first three or four months of life. The child's first feeds should consist of diluted milk, in the proportion of one of milk to three of water, and to this 60 gr. or a small teaspoonful of lactose merely should be added to every 3 oz. of food. At the end of the first week 1 teaspoonful of cream should be added as well. About the third month the child should be taking one of milk to two of water, with a teaspoonful of milk sugar, and 2½ teaspoonfuls of cream to every 4 oz. of the mixture.

For the *middle period* of infancy—*i. e.,* from the end of the third or fourth month to the end of the ninth or tenth—the amount of fat in the food should be twice that of the proteids.

These proportions correspond to rich breast-milk. The ideal way to obtain this is to get a milk containing 7 per cent. of fat and 3.5 per cent. of proteid, and this is found in the top *half* of the milk, which has been allowed to stand, as I described just now, that for the earlier months, you will remember, having been the top *third*. The child is now, at the end of the third or fourth month, able to take as food 7 oz. of the top half of the milk, with 1 oz. of lactose and 1 oz. of lime-water, as before, diluted to 20 oz. The milk is again to be increased ounce by ounce as time goes on, till at the end of the ninth or tenth month he takes 10 oz. of this top milk in 20 oz. of food. Translating this again for use in the case of poor patients, we begin the fourth or fifth month with ordinary milk diluted with rather more than an equal part of water, and to every 4-oz. feed we add 3 teaspoonfuls of lactose (100 to 120 gr.). The milk is increased in amount till at the end of the period the infant takes half-and-half milk and water with sugar as before, and 4 teaspoonfuls of cream to 5 oz. of the food.

During the *later part of the first year* the child should be rapidly pushed on to plain milk in 8-oz. feeds, with the added sugar, reduced to about half the former amount, as much of the carbohydrate may now be given in the form of starch. Starchy foods may, indeed, be given a little earlier than this, but at all events not before the seventh or eighth month as a rule. The starchy foods which are advisable are gruels made from barley, arrowroot, or oatmeal—the last if the child has a tendency to constipation—or some farinaceous food. With regard to barley-water, which is the commonest starchy food, it should be made as follows: Take 2 tablespoonfuls of barley and soak it in water for a few hours, then remove the barley and add 1 quart of *fresh* water. Set it to boil continuously for six hours, keeping up the quantity to 1 quart by the addition of water, and at the end of that time strain through coarse muslin. This sets into a thin jelly when cold, and should, therefore, be warmed before being added to the food. It is best to begin by making the food consist of one third barley-water, and as time goes on to increase the strength of the barley-water rather than to use a larger quantity. The only other things that are advisable during the first year are beef-juice and fresh fruit. Beef-juice is made by adding 8 oz. of water to 1 lb. of chopped beef, and allowing it to stand for six to twelve hours. The juice is then extracted by squeezing the meat in coarse muslin or in a lemon-squeezer. A little salt should be added, and 2 to 3 teaspoonfuls may be given daily during the tenth or eleventh month. About the same time ½ to 2 oz. of fresh fruit juice—such as that of an orange—may with advantage be given in the morning.

Table III.—Composition of Feeds.

Age	Cow'smk	Water	Additions
1 week	1 part	3 parts	1 teaspoonful (sm.) lactose to 3 oz food
2—12 weeks	1 part	2 parts	1 do. and 1 teaspoonful of cream to 3 oz.
3—5 months	1 part	2 parts	1—1½ do. and 2½—3½ do. do. 4 oz.
6—9 months	1 part	1 part	1½ do and 4 do. do. 5 oz.
9—12 months	Pure	——	1 do. to 8 oz., together with starchy food

Having now settled the constituents of the baby's food, we must consider *how often* and in *what amounts* it must be given. Merely to repeat the times and quantities would be wearisome, so I have tabulated them in Table IV. Suffice it to say that an infant should not be fed oftener than every two hours, and not whenever the mother "thinks it wants it." Feeding too often is naturally a source of indigestion, and the child cries. This, the mother imagines, is from hunger; more food is given, which perhaps relieves the pain for a time, but more pain follows, and so the child goes from bad to worse. After the fifth week every two and a half hours is sufficient, and after the third month once in every three hours. With regard to the night feeds, pray remember that they are frequently given too often and long after they are necessary. This is, of course, bad for both the child and the mother. Two night feeds are required during the first three weeks, and after the fifth month they should be discontinued.

I next come to the important question of *sterilization*. Should the milk be sterilized or not? It is an important question and one on which authorities differ. For my own part, I think that unless one, so to speak, knows the cow from which the milk is drawn, and the way in which the milk is handled, and unless one can be certain that it is never more than twenty-four hours old, all the baby's milk should be sterilized, and this is especially important in dealing with the poorer population of large cities. The simplest and a very efficient way of sterilizing milk is to bring it up to the boil, and then set it in a cool place or on ice till it is required. Spores are not destroyed, and at an ordinary temperature spore-bearing bacteria may soon develop and make the milk dangerous. Some of these act upon the proteids and not upon the sugar, so that such milk it not always sour, and the danger may escape detection. Again, the taste of the milk is altered, and some of the lactose is converted into caramel, causing it to become a brownish color. These, however, are but slight drawbacks; more important are the coagulation of part of the lactalbumen by heat (the scum on the top of boiled milk), the greater resistance to the action of pepsin and trypsin, the constipating effects of such milk, and the destruction of certain natural ferments which apparently aid digestion. As the result of one or more of these changes the milk is rendered less nutritious, and possibly is liable to give rise to scurvy when used for some time. In spite of all these drawbacks, however, I give it as my opinion that in the case of hospital patients it is best to have all the milk boiled.

Table IV.—Artificial feeding during first Year.

Age	Interval during day	Night feeds	Feeds in 24 hours	Quantity per feed	Quantity in 24 hours
3—7 days	2 hours	2	10	1—1½ oz.	10—15 oz.
2—3 weeks	2 hours	2	10	1½—3½ oz.	15—35 oz.
4—5 weeks	2 hours	1	10	2½—3½ oz.	25—35 oz.
6 wks.—3 months	2½ hours	1	8	3—5 oz.	25—40 oz.
3—5 months	3 hours	1	7	4—6 oz.	28—42 oz.
5—9 months	3 hours	0	6	5—7½ oz.	30—45 oz.
9—12 months	4 hours	0	5	7—9 oz.	35—40 oz.

A better and more efficient method of sterilizing is by Pasteurization (if you will allow me to use the word), but this, of course, requires care and a special appaartus. Bottles of milk are placed in a metal receptacle and exposed to steam at a temperature of 155° F. for half an hour. In this way the bacilli of tuberculosis, diphtheria and typhoid are destroyed, and most other bacteria, though, of course, not the spores or toxins. Various forms of such appartus are on the market, but I cannot enter into the details of their construction now. They are, of course, only within the reach of well-to-do parents. Before leaving the subject of sterilization I need hardly add that all the water used for diluting the milk should be thoroughly well boiled.

Now a few points concerning the *administration* of the milk. The food should be warmed to about 100° F. before feeding. This is best done by placing the bottle in a saucepan or dish containing water rather above this temperature. The milk, when dropped on to the back of the hand, should feel warm but not hot, and this is sufficient test of the temperature. The mother should on no account be allowed to suck the nipple with her own mouth. The time allowed for a feed should not exceed twenty minutes, and the infant should not be allowed to go to sleep with the nipple in its mouth. When the feed is being given care should be taken that the neck of the bottle is always kept full, so that the child sucks milk and not air. The best kind of bottle, as you know, is the boat-shaped one with a widish mouth, over which a short nipple is slipped. These are fairly easily kept clean, and the nipple can be everted and washed. The round bottles with long tubes are to be condemned, as it is impossible to keep them clean: to this kind the French have given the very appropriate name *tue-bébé.* It is best to have two bottles for alternate use. After the feed both the nipple and the bottle should be rinsed in cold water and then washed with warm soap-suds, the bottle being well scrubbed out with a brush. They should then be allowed to stand in water, to which a little borax or boracic acid has been added, while the second bottle is in use. Before being used again they should be rinsed and the bottle placed in boiling water for ten minutes. There is one point to be remembered about the nipple, and that is, always examine its aperture; some are too small, so that the child has a mechanical difficulty in sucking, and perhaps does not get enough food; others, again, are too large, and the child gulps down the meal too quickly, with the result that vomiting and colic often follow. The hole should be just large enough to allow the milk to flow at the rate of one drop per second when the bottle is inverted.

Now, how are we to tell if the patient is thriving on the food that is given to it? Of course appearances are some guide, but in children who are much wasted when first seen, it is often very difficult to tell by merely looking at them whether they are improving or not as time goes on. In these, and in fact in all cases, it is best to have the child's weight regularly taken. I do not mean by this a daily weighing, for slight variations from day to day are apt to alarm a nervous mother and mislead the physician. Once or twice a week is sufficient for us to judge the progress of a case. For this purpose we must use scales weighing to half-ounces. Several patterns of these will be found in the instrument-maker's catalogues. You must remember, however, that during the first two days infants lose about 10 oz. in weight, owing partly to the discharge of meconium and urine, and partly to the small intake of food. They then, if breast-fed and thriving well, steadily increase in weight at the rate of about 1½ oz. a day, till about the tenth day they reach the original weight at birth. With children artificially fed from the first, however, there is usually a stationary period, lasting on to three weeks after the initial drop, before the weight begins to increase. This is due to the digestive organs taking some time to become accustomed to the new food, and must not be taken as an indication to increase either the strength or the quantity of the food unduly rapidly, or indigestion will be the result. The most rapid increase in weight occurs during the first three months, and the slowest from the sixth to the ninth month. In artificially fed children, as I have said, the increase during the first month is slow, but the deficiency between such a child and a breast-fed one is usually made up by the sixth month. At the end of a year the child's weight should be nearly three times that at birth.

If, then, we find that the baby is not gaining weight, although it is digesting well, and has no untoward symptoms, it means that it is not having enough food. With all infants it must be remembered that it is best to increase the food very gradually. Rapid changes are apt to upset the digestion, and it is seldom wise to add more than ½ oz. at a time to the feeds, or even ¼ oz. in the case of young babies. It is best perhaps to alternate increase in quantity and increase in strength of the food. In this way too great an increase of bulk is avoided. Of course babies are not all exactly alike in their powers of digestion, so that you must not adhere too strictly to the tables that I have given you: they represent the average infant's powers. What you have to do is to treat your patient, and if you find he wants and can digest more food than is usually required, well, then give it to him.

Next I come to deal with *loss of weight from constitutional causes or disease,* and will begin most conveniently with *marasmus* or simple wasting. This is a failure of assimilation, "a vice of nutrition" as it has been called. The condition often occurs when weaning has been rendered necessary at about a month or six weeks. Previously to this the child has been plump and well nourished, but with a change of diet it steadily wastes. The stools usually contain undigested food, and are large in proportion to the intake. Digestion is upset, and vomiting is easily excited. Now, these cases require very delicate and careful handling, and frequently, in spite of all one's endeavors, they eventually slip through one's fingers. Although they seem to be taking sufficient nourishment, they gradually get worse. Under the age of four months it is best to put the child to a wet-nurse; artificial feeding frequently fails. Above the age of six months the child has a better chance, and bottle-feeding may be employed. These children have difficulty in digesting the proteids and fats, so that both these constituents must be reduced by diluting the milk, while the sugar is kept relatively high. It is a mistake to increase the fat in the hope that the child will assimilate more. In these cases where the digestion of proteids is the chief difficulty the milk may be *peptonized* either partially or completely. Partial peptonization is brought about by mixing 1 pint of milk with ¼ pint of water and adding 5 gr. of pancreatic extract and 15 gr. of bicarbonate of soda. Fairchild's zymine powders are of this strength and are most commonly used. The vessel is then placed in hot water with a temperature of 110° F.—about as hot as the hand can bear—for a quarter to half an hour. Some of the proteids are thus converted into peptones, and to prevent the furtherance of the process the milk should then be rapidly brought to the boil. It should then be kept in a cool place until needed. To peptonize the milk completely the process is continued for two hours, by which time all the proteids will be converted. Such milk is rather bitter, but infants, as a rule, take it readily after the first bottle or so. With older children a little lemon-juice and sugar will cover the taste. The peptonized milk should be diluted according to the child's requirements, though it is perhaps better to regulate the proportions before peptonizing. So also it is better to peptonize each feed separately, in which case there is no need to scald the milk, and the action of the pepsin can continue in the stomach.

Another way of helping the digestion of proteids is by the addition of some *cereal gruel,* which is often of great benefit, though it must always be remembered that for healthy infants with normal digestions such additions to the food are not only undesirable, but often harmful. The gruel apparently prevents the casein from forming such dense masses of curd in the stomach, and in this way higher percentages of proteid can be digested than would otherwise be the case. The stools become more natural and the colic and general disturbance abate. Such gruel is made from barley, oatmeal, or arrowroot, one tablespoonful of the flour being added to a pint of water and boiled from twenty to thirty minutes, the whole being again made up to a pint at the end. The gruel is used to replace either the whole or part of the water in the feeds.

If these methods fail, or as an alternative proceeding, we may remove the casein from the milk and feed the child on food made with the resultant *whey*. To make whey we proceed as follows: In 1 pint of lukewarm milk 2 teaspoonfuls of rennet are stirred, and the mixture is allowed to stand until coagulation takes place. The curd is then broken up and the whey strained off. This is an age of tabloids, so that perhaps it is not surprising to find rennet tabloids on the market. Hansen's junket tablets, one dissolved in a quart of milk, act very well, and may be used, if preferred, instead of the fluid rennet. The whey contains a little proteid in the form of lactalbumen, which is readily digestible, and practically all the sugar of milk, but very little fat—less than 10 per cent. This deficiency must, therefore, be made good by the addition of cream and a little sugar to bring the percentage up to the child's requirements. Before adding the cream the temperature of the whey should be raised to 150° F. to destroy the rennet ferment, and any further coagulation that occurs during the heating should be filtered off.

Another, more recent, method of rendering the casein less dense and so more digestible is by adding *sodium citrate* 1, 2, or 3 gr. to every ounce of food, as suggested by Dr. Poynton. A solution of sodium citrate containing the requisite number of grains to the drachm, according to the number of ounces in each feed, is prescribed with a little chloroform-water to check fungus growth, and the mother is told to add one teaspoonful to each bottle. This method is a very good one, and I have repeatedly found it of much value in cases of milk dyspepsia.

In addition to malassimilation of the food these wasters often suffer from lack of fluid and benefit greatly by enemata or subcutaneous injections of normal salt solution. They must also have a good supply of fresh air and must be kept warm.

On rare occasions it may be necessary to have recourse to *condensed milk* when other methods prove of no avail, though the period of its use must be limited as far as possible. Why this must be, and why condensed milk is at times useful, I will tell you in a minute, but first let me put in a word or two of warning concerning such milk, which I consider one of the greatest scourges of the infant poor. Why it should be such a favorite with mothers, and I regret to say with many medical men also, I am at a loss to understand, and I am not exaggerating when I say that many medical men resort straightaway to condensed milk when the child shows any sign of intestinal disturbance. If you ask mothers why they use it, you will find that they have generally no reason whatever to give. The only excuse, which is at all legitimate, is that in summer it is at times difficult or impossible to obtain cow's milk sufficiently fresh to remain sweet until the following day. This may be the case with milk bought at the average milk-shop, but with a little trouble it is possible to find dairies, even in the heart of this London of ours, where you can see the milk drawn straight from the cow, and I know of two such places in the poorer districts of South London.

Condensed milk is prepared by heating fresh milk to boiling point to destroy bacteria, and then evaporating it *in vacuo* at a low temperature to one one quarter of its volume. Cane-sugar is added—about six ounces to the pint—and the milk is then preserved in hermetically sealed tins. The composition of such milk is given in Table II. It is usually given diluted with 16 or 18 parts of water, but I have known infants to be fed on the plain milk from the tin with, of course, the inevitable results.

A glance at the composition will show that condensed milk contains when diluted little proteid, very little fat, and an abundance of sugar; moreover, the natural ferments are destroyed by the heat to which it has been subjected. For these reasons it is inadequate as a permanent food, and out of my series of rickets 19.5 per cent. were found to be due to its continued use. As a temporary expedient it may, as I have said, be useful on occasions when other methods fail, as after dilution the casein is reduced to a very low point, whereas there still remains an abundance of carbohydrate, which is the easiest thing for an infant to digest. But let me once more impress upon you that the occasions when it is necessary to resort to condensed milk are very few and far between, and it should never be ordered unless the case is under your constant supervision. For my own part I scarcely ever order it for hospital out-patients, as there is a great danger that, its use having been once sanctioned, the mother will continue giving it after the child has got better and ceased attending. That it is possible to do without it is further borne out by the fact that in the wards at the Evelina it is very seldom employed.

I next come to lesions of the stomach and intestinal tract. It is important to discover which of the two is at fault; and, speaking broadly, we may take it that vomiting, eructations, and a coated tongue indicate some derangement of the stomach, and that the intestines are affected if we find colic, flatulence, distended abdomen, diarrhea or constipation, and curds or mucus in the stools. The first thing to do is to inquire into the manner of feeding of the child and to bring home to the mother any irregularities according to the broad principles that I have already described. Then, having decided from the symptoms that we have to deal with a case, say, of *acute gastric indigestion* or *acute gastritis,* the best mode of treatment is to empty the stomach and then give it rest for a time. By far the best method of of emptying the stomach is to wash it out. The method of procedure you all know. A catheter with a long india-rubber tube and funnel attached is passed into the stomach. The gas is allowed to escape and the stomach contents are then siphoned off by lowering the tube. Plain boiled water at about 100° F., or water to which a little sodium bicarbonate has been added, is then introduced and allowed to escape, the process being repeated two or three times, until the water is returned clear. If this is impracticable, vomiting may be induced by giving large quantities of lukewarm water from the bottle, but this plan is not so efficacious. After this nothing should be given for the next three or four hours, when ½ to 1 oz. of whey or albumen-water should be administered every hour. Albumen-water is merely the white of a fresh egg breaten up in half a pint of previously boiled water, with the addition of a little salt. After twenty-four hours raw beef-juice or broth may be tried, but no milk should be given for at least three days. When milk is begun again it should be peptonized and diluted with five or six parts of water. In a nursing child the breast should be withheld for twenty-four hours and then resumed for two minutes every three hours, the time of suckling being increased minute by minute as the child improves. The great mistake is to begin food too soon and to give too much, especially of cow's milk.

You will notice that up to the present I have not said a word about drugs. In the cases with which I am dealing they are really of very secondary importance. Attend to the feeding, and you will in most instances bring about a satisfactory result. If, however, the bowels do not act freely, you may give calomel in 1-8 gr. doses every hour until they do, or if there is persistent vomiting of very acid mucus, alkalies, such as lime-water, chalk, or bismuth, are useful. The child should be kept quite quiet, and warm applications to the abdomen are often beneficial if there is much prostration.

In cases of *chronic gastric indigestion* daily lavage of the stomach should be made with alkaline water to remove the mucus and stimulate the secretion. It is necessary, also, to determine which constituent of the milk is the chief source of the trouble; it is most frequently the fat, next the proteids, and only rarely the sugar. A too high proportion of fat brings about a regurgitation of sour, curdled milk, or a watery fluid, one or two hours after feeding, and the passage of offensive stools, either large, dry and grayish in color, or loose and rather green. Excess of proteids is evidenced by colic, curds in the motions, and often constipation. The food, therefore, must be regulated as occasion requires, though where serious and long-continued trouble exists a change to a farinaceous food may for a time check the gastric fermentation. Drugs here, again, are of but little real value as compared with regulation of the diet. Pepsin and hydrochloric acid are disappointing, though where flatulence is a prominent symptom salicylate of soda in 1 to 2 gr. doses is of much value.

Associated with acute gastric symptoms, we frequently find indications of *acute intestinal derangement,* and for the intestines the same general plan should be employed as for the stomach—first evacuation and then rest. Small doses of calomel, or doses of castor oil or salines, should be given until a full effect is produced, and all food should be withheld for twenty-four hours.

Thirst may be relieved by small quantities of albumen or plain water, and brandy is indicated if there is much collapse. After the bowels have been well cleared out, Dover's powder up to ¼ grain may be given after each stool to check any excessive diarrhea. Stimulants are required in severe cases, as the prostration is often great, and *m*x of brandy may be prescribed every one or two hours, according to the age. With regard to the use of opium, you must, of course, be very careful, and it should only be used to check excessive diarrhea. Furthermore every care should be taken to keep the child warm. With nursing infants breast-feeding may be resumed after twenty-four hours, but only at intervals of six hours, and for five minutes at a time. In between other foods should be administered. Artificially fed children should be kept without milk for five or six days, broths, farinaceous, or malted foods being given. Milk should be resumed very cautiously, and only for one or two feeds each day to begin with: it may with advantage be peptonized. As fat is likely to cause disturbance, cream should be added.

In the summer-time we frequently come across cases of *acute gastro-intestinal intoxication,* gastro-enteritis, or summer diarrhea, as it is sometimes called. This appears to be infective in origin, as it occurs for the most part in artificially-fed children, and at a time when the high temperature favors bacterial growth. During the wet summer of 1903, for instance, I noticed that these cases were remarkably few in number, and I believe that such was the case at other hospitals than my own. Curiously enough, cases of cerebro-spinal meningitis were at that time especially numerous, and among my out-patients at the Evelina I frequently had two or three cases waiting for admission into the wards. The treatment of cases of gastro-enteritis resolves itself into hygienic, dietetic, and medicinal. With regard to hygiene, fresh air is of the utmost importance. Children in towns should be sent into the country if the attack does not subside in a few days, and in any case a change is advisable to prevent the danger of a relapse. The child should be kept out of doors for the greater part of the day, and its clothing should be light but warm. Especial care must be taken to remove immediately all soiled napkins and to keep the child clean. The dietetic treatment consists in stopping all food, and especially milk, at once. Thirst may be relieved by whey, thin barley-water, or albumen-water. After a day or two, according to the symptoms, the food may be cautiously resumed. Broths (strained, of course), farinaceous, or malted foods may be first tried, and then very small quantites of boiled milk, carefully watching its effects on the stools and temperature. Speaking generally, the quantity should be a quarter or half of that usually given in health, and sufficiently long intervals allowed between the feeds—viz., at least two hours, and often better four. Here, again, the therapeutic treatment consists in first emptying the stomach and intestines to remove all toxic substances. The stomach should be washed out, and calomel, castor oil, or salines given, and this treatment should be repeated if symptoms of fresh intoxication develop. Irrigation of the colon is also advisable, as it hastens the removal of offensive material. Such antiseptics as bismuth, preferably the subnitrate or the salicylate, in sufficiently large doses—*e. g.*, 5 to 10 gr., salicylate of soda or salol 1 to 2 gr., resorcin ½ to 1 gr., are at times useful. Alkalies and chalk are of value in the acute stages and dilute hydrochloric acid later on. Astringents often do more harm than good, but with excessive catarrhal diarrhea they are advantageous, and sometimes it is necessary to resort to opium in minute doses. Stimulants are required in many severe cases and should be always given well diluted. When there is extreme prostration warmth is essential, and where the drain is very rapid and great subcutaneous injections of saline solution will at times confer a great and lasting benefit.—*The Clinical Journal.*

THE QUOTIENT OF ENERGY AS A BASIS FOR INFANT FEEDING.[1]

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At the outset an apology must be made for attempting to offer a new method of infant feeding. The truth is that I do not offer such a new method, but merely call attention to a means of control which has a great value, and yet has not received the consideration which it merits.

That we need some method or rule by which the quantity of the solid food in the milk may be properly adjusted is very evident, when we consider that the prevailing rules for infant feeding, while taking account of the percentage constituents, do not, except in a very general way, control the quantity. Percentage feeding has become generally accepted as the most rational method, but in order to meet all the requirements, it is necessary to have a rule by which in any given case, the total quantity of solid food and its relation to the infantile organisms may be determined. For example, let us assume that an infant is fed on a milk mixture, which, on account of some peculiarity of digestion, differs very widely from the formulæ laid down by Rotch, Holt and others, how can the physician know whether the infant is getting enough food to satisfy the actual needs of life? Or, let us suppose, it must be fed on a mixed feeding, say, broth and cereals, with some milk—is there any way in which the physician may approximate the necessary amount?

True, in most healthy babies this total quantity may vary within wide limits, and it is the general custom to let the baby's appetite judge of the quantity necessary. Whenever the little one does not gain in weight, seems hungry, is constipated, these are indications that the food should be increased. But there are many infants for whom it is necessary to maintain the quantity at a minimum; others must not have the food increased above a certain limit without causing digestive disturbances.

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[1] Interstate Medical Journal.

For some time I have been using the quotient of energy (E. Q.) as a basis of infant feeding in certain difficult cases; moreover, have used it as a test, whenever the question of food quantity was under consideration, and the satisfaction derived gave rise to this article.

Several methods have been suggested for expressing the relationship of the infant to the food. One of these is the ratio between the infant's weight and the amount of food taken in twenty-four hours, or, more exactly expressed, it was the relative amount of milk taken by each kilogram of weight. The name nutrition-quotient (Nahrquotient) has been given to the percentage relationship of the gain in weight and the total quantity of milk. These relationships are valuable only when the food is human milk. When artificial food is given some other formula must be devised.

A very happy suggestion, therefore, was made by Heubner (1900) when he proposed that the food constituents should be expressed in heat units, that is, calories. If the composition of the food is at least approximately known, the number of large calories in a given quantity may be easily calculated from the fact that 1 gram. each of proteids and sugar equals 4.1 calories and 1 gram. of fat yields 9.3 calories.

If the calories ingested in twenty-four hours are determined and the relationship to the weight of the infant is calculated, we get a number which may be utilized in making comparisons in the nutrition of the same or different infants. To this number Heubner has given the name energy-quotient. The energy-quotient is the number obtained by dividing the number of daily calories by the number of kilograms in the body-weight. It, therefore, expresses the number of calories given to each 1000 gram. of the infant's weight.

There has been much dispute as to the proper energy-quotient for the infant. In spite of all the objections brought against his figures, Heubner is probably correct in stating that the proper amount of calories for each kilo of a healthy infant is about 100 calories, many infants thrive on a much smaller quantity; often infants require more to satisfy their appetite; still 100 calories (E. Q.) may be safely regarded as a normal average.

In any method of feeding infants, it will be found expedient at times to calculate the calories in a day's feeding, and ascertain how much more or less than this standard is given. It should be remembered, however, that the energy-quotient gradually diminishes as time advances, so that the relative food value of the infant at one year is less than it was at one month.

There are several diseases in infancy, *e. g.*, marasmus, for which it is necessary for a time to reduce the quantity of food to the lowest limit compatible with life. Again, in the feeding of certain difficult cases, while it is necessary to adjust the percentage of the food constituents it is also necessary to control the total quantity.

The conception implied by the term energy-quotient will have a decided value in that it will diminish the exclusive use of certain foods which are often believed to have a high nutritive value, *e. g.*, albumin, water, broths, cereal decoctions, etc. On calculating the contained heat units in any of these foods, their poverty in calories is obvious.

It is generally conceded at present that marasmus (infantile atrophy) is best treated by giving the infant a minimum quantity of food. On account of the great tendency of acidosis present in these cases, the fat must be given in a low percentage, but nevertheless, the infant must receive sufficient heat units in the food to maintain life.

It has been determined that 70 calories is a minimum energy-quotient for young infants. This is almost the least quantity that will insure a stationary weight. A few infants have been observed to gain on an alimentation represented by an energy-quotient of 55 calories. Hence, it is perfectly safe to reduce the food to 60 or 70 calories energy-quotient.

In order to apply the method in a particular case, weigh the infant. Determine then by the rules laid down by Rotch, Holt, etc., what percentage would most likely agree. Then calculate the total quantity for twenty-four hours on the basis of the energy-quotient. Let me give an example.

Case I.—Infant L., female, aged five months, had been suffering from severe dyspeptic symptoms for three months, all kinds of food having been tried without success by the mother.

Examination revealed the infant in a state of severe atrophy, no diseased organ was discovered. Weight about 8 pounds (3,700 grams).

The infant was placed on a mixture made from whey, top milk (containing about 10 per cent. of fat) sugar, and a cereal decoction made from roasted flour.

The directions to the mother:

Roasted flour gruel	10 ounces
Whey	11 ounces
Top milk	3 ounces
Sugar	5½ drams

Give three ounces at a feeding, eight feedings in twenty-four hours.

This mixture had approximately the following composition:

Fat	1.25 per cent.
Proteids	.90 per cent.
Sugar	.1 per cent.
Insoluble carbohydrates	.6 per cent.

This, on calculation, contained in each ounce energy equivalent to 12 calories. Twenty-four ounces then would contain 288 calories, which, divided by the number of kilos in the weight of our little patient (3.7) gives an energy-quotient of 77 calories. Since 70 calories is considered a fair minimum, I could feel assured that my little patient received enough food. After a few days the infant commenced to gain in weight and the energy-quotient was gradually increased to 100 calories.

Physicians have too little appreciated the value of a minimum alimentation, although, we can scarcely agree with Keller, who makes this statement: "The physician who teaches mothers the advantage of a minimal feeding accomplishes more for the benefit of mankind that he who gives good milk for infant feeding." Still, there can be no doubt that in the treatment of various non-infective digestive disturbances the minimal feeding is the best therapeutic measure, and to feed by small quantities successfully, a knowledge of the energy-quotient is indispensable. Many digestive disturbances are kept up indefinitely by giving too much food. Accurate percentage modification is really less important than adjustment of the total quantity of the solid constituents to be ingested.

I will briefly refer to two other instructive cases:

Case II.—Female, age 7 months, has passed through a severe gastroenteritis during the summer. The physician in attendance placed the infant on a milk dilution made from "top milk," but the infant continued to have digestive disturbance. On calculation I ascertained that the food administered was represented by 140 calories (E. Q). The following table gives weekly weight and the food ingested in calories approximately:

DATE	WEIGHT GRAMS	ENERGY QUOT.	WEEKLY GAIN
October 15	3820	145	
October 22	3820	140	00 gm.
October 29	4090	100	170 gm.
November 4	4204	105	114 gm.
November 11	4396	100	192 gm.
November 18	4459	110	63 gm.
November 25	4700	110	241 gm.

From this table it is obvious that the infant gained very little until the quantity of milk was reduced.

Case III.—Infant, age 4 months, after passing through a number of digestive disturbances, weighing only 5 pounds, was found to be taking a milk dilution which contained heat units equivalent to an energy-quotient of 200 calories. No improvement was procured until the food was cut down so that it represented 100 calories (E. Q).

These cases could be increased, but I refrain from giving long details. Let me urge, however, that the use of this standard necessitates a knowledge of the composition of the milk which is being used. Before the energy-quotient can be of any service, modern methods of percentage feeding must be mastered.

In gastroenteric infections it is good practice to limit the feeding for a short time to cereal decoctions or albumen water. But simple calculation will show that these mixtures, when no sugar is added, contain only 1 or 2 calories to the ounce, while human milk contains 21 calories to the ounce. In order to give a reasonable food value to rice-water or albumen water, sugar must be added so that the percentage of solids is about 7 per cent., when nearly 10 calories will be found in each ounce.

In the case of the premature infant, the use of the energy-quotient to control the amount of milk is by far the safest method of feeding. As I have written at length on this subject elsewhere (St. Louis *Courier of Medicine,* March) it is unnecessary to dwell on the methods at this time.

There is, however, another condition when the energy-quotient will be found useful, and that is when an infant is getting enough food. If, on calculation, it is found that the infant receives more than 100 calories to each kilo of body-weight, we must seek elsewhere than in the quantity of food as the cause of the loss in weight.

Not long ago this question was brought to me very forcibly in the case of a young infant, who could not digest any modification of cow's milk. It was finally put on an alimentation composed of whey, mutton broth, barley gruel, plasmon, and cod liver oil. The food was mixed as follows:

Whey	20 ounces
Mutton broth, with barley flour	16 ounces
Milk sugar	2 per cent.
Plasmon	3 drams.

Cod liver oil in 15-drop doses was given three times daily. But the baby did not gain in weight after persistent trial. It then occurred to me to test the total quantity by determining the energy-quotient. After an elaborate calculation, in which due allowance was made for the variation in the composition of the different ingredients of the food, it was found that the quotient of energy was below 80. The total quantity was increased, sugar and cod liver oil given in larger amounts, so that the food represented 110 calories E. Q. The infant commenced to gain rapidly.

Let me not be misunderstood. The weight of the infant is by no means such an infallible guide to feeding, so that a definite energy-quotient will serve for every infant. Some infants will gain rapidly on a relatively small quantity of food. Infants who are restless and very irritable need more, consequently some will require a food which is represented by more than 120 calories energy-quotient.

In conclusion, I wish to reiterate that the use of the energy-quotient as a guide in infant feeding does not replace the method of feeding by percentages, but it supplements it and makes it more perfect.

ON SOME CASES OF INFANTILE SCURVY WITH UNUSUAL FEATURES.*

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OF LONDON, ENG.

The results of treatment in infantile scurvy are usually so prompt and successful that post mortem examinations in cures of that complaint are by no means frequent. Owing to this, our knowledge of the pathology of the disorder is still unsatisfactory and incomplete. A notable instance of this is our ignorance of the changes that may occur in the periosteum when separated by hemorrhage from the shafts of the bones. As a contribution to a more definite knowledge on this point, brief notes of the following cases may be acceptable and of interest.

A. B., a female infant, aged eight months, was admitted into the East London Children's Hospital on Aug. 5, 1904, under my care. The family history showed little that was important; both parents were healthy, and there was one other child, fed on the same foods as the patient, who was distinctly rhacitic, The patient had been suckled for one week only, then for the succeeding five months it was fed on Nestle's milk and barley water, and for the last three months on Allen and Hanbury's No. 3 food. For the past month the infant's right leg has been tender on handling, and for the last six days had been in addition swollen and slightly red.

On admission the infant was fairly nourished but was anemic and fretful. There were no bony manifestations of rickets. The lower end of the right femur was felt to be thickened, and the thigh was slightly swollen, shiny and red, but did not pit on pressure. The swelling was evidently acutely painful to touch or manipulation. There were no swellings on any of the other limbs, but they appeared tender on being handled. No teeth had been cut, and the gums were not spongy. There were no cutaneous hemorrhages, and no history suggestive of hemorrhage into any of the viscera. Unfortunately, however, the urine was not tested for blood, until the child had been treated with lemon juice for several days. The temperature was 100° F., the pulse 120, and the respirations 40 to the minute. The infant was put on lemon juice and ordered fresh milk and water slightly thickened with scraped potato.

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*St. Louis Medical Review.

Two days after admission diarrhea set in, with a high temperature. Albumen water was substituted for cow's milk for a couple of days, and the lemon juice was omitted. At this time crepitus was discovered over the lower end of the right femur, and it being considered that the lower epiphysis was separated from the shaft, a long splint was applied to the limb. The tenderness on manipulation in her other limbs had nearly gone and did not recur.

On Aug. 13, the diarrhea was better, so the lemon juice was again resumed, each dose being guarded by the addition of half a minim of laudanum. In spite of this, however, the femoral swelling increased in extent and firmness, and so on Aug. 19, a syringe was inserted and drew off some thin serous looking blood, which was not suggestive of malignant growth.

Ten days later, Aug. 29, egg-shell crackling was detected over the swelling, which had extended still further up the femur, and the whole thigh looked blue and congested. The splint was removed, as it was considered that the epiphysis had reunited to the shaft. A skiagram taken on this date showed what was taken to be a thin layer of bone on the outer limits of the swelling. The thigh measured 8¼ inches in its greatest circumference, and no increase on this was afterwards observed.

The size and persistence of the swelling and the increased weight of the limb having led several observers to question the diagnosis of scurvy in favor of that of a sarcomatous growth, on Sept. 2, I got my surgical colleague, Mr. Cuthbert-Wallace, to cut down upon the swelling, and he exposed a bony surface, while the section proved to be a bony shell surrounding a cavity filled with brown viscid fluid. The shaft of the femur, bare of periosteum, was felt running through the cavity.

After the last date no alteration in shape or size of the swelling was observed. The child's general condition became steadily worse, and on Sept. 9, she died; diarrhea and vomiting having recurred during the last days of her illness.

At the post mortem examination nothing noteworthy was found, save the remarkable condition of the parts around the right femur. Surrounding the femur for its almost entire length, was a layer of bone formed in the detached periosteum, the new bone in places being thicker than the femur itself. Between the recently formed periosteal bone and the femur was a cavity containing blood clot. It may be further noticed that the detached lower epiphysis had not in reality become reattached to the femur, but was held in position by the osseous periosteal shell. The pathological specimen is somewhat a unique one, and one-half of it is in the museum of St. George's Hospital and the other in that of St. Thomas' Hospital.

As a contrast to the bone formation in the detached periosteum in the last case, brief notes of the following one may be of interest.

While the last patient was in the hospital, another infant, aged ten months, was admitted under my care. Like the former, this one had also from an early age been fed on Allen and Hanbury's food. From the history, the infant had evidently suffered from pronounced scurvy for at least three months, although the condition had gone unrecognized until admission to hospital. The child was extremely wasted and anemic, and there were numerous subcutaneous hemorrhages, of varying size, over the limbs and trunk. The gums were spongy, bled easily, and the breath was offensive. Both thighs were swollen and tense, and there was evidence of other subperiosteal hemorrhages in both the legs and arms. As the infant was moribund, no exact examination was justifiable, but a very superficial one sufficed to show that the lower epiphysis of each femur was detached from the shaft and unduly movable. The infant never rallied and died a few hours after admission.

As in the last case, the interest at the post mortem examination centered in the condition of the femora. In addition to the lower epiphysis, both upper ones were detached as well, and each shaft lay free in a cavity formed by blood clot and blood soddened muscles. Each shaft, too, was rotated so that the external surface looked inward and slightly forwards. Instead of bone, moreover, having formed in the detached periosteum, that membrane had undergone a process of necrosis and no trace of it was discovered in either limb.

Either contingency, the formation of bone in the detached periosteum, and still more so the necrosis of that membrane, is a formidable complication in infantile scurvy. The question arises, then, as to whether it would not be advisable to incise the periosteum and turn out the blood clot in cases where resolution is unduly delayed. On more than one occasion, where the diagnosis was at fault, I believe the operation has been done without mishap. In my first case, fearing that the nutrition of the periosteum might suffer from the long separation from the shaft, I consulted Mr. Cuthbert-Wallace as to the advisability of this operation, but he was opposed to it, and in his decision I acquiesced. I gather from him, however, that in future cases of a similar nature he would regard the procedure with favor.

Another important point in treatment is called up by the first case. Very soon after the death of this patient two further cases of infantile scurvy, with subperiostal hemorrhages over the femora, were admitted into the hospital, the one under my colleague, Dr. Eustace Smith, and the other under myself. Both were ordered fresh cow's milk, along with raw meat juice, scraped potato, and lemon juice. In neither case, however, did the usually speedy resolution of the subperosteal clot take place. On the contrary, a thin plate of bone formed in each periosteum, a condition confirmed by radiographs taken by Dr. George Graham. That three consecutive cases of scurvy should take this unusual course led to an inquiry, and it was found that for several months past the dairy company has been supplying the hospital with pasteurized, instead of fresh milk, and this without the hospital authorities having been informed of the change. Thus, the three infants had been unwittingly fed on pasteurized instead of fresh milk that was ordered. On the substitution of fresh for pasteurized milk the last two patients began to improve, but it was many weeks before the periosteal bone finally disappeared. Now, I can state, with some degree of accuracy, that during the last twenty years at the Shadwell Hospital the only cases of infantile scurvy, developing bone in the detached periosteum are these three that were treated by mistake with pasteurized, instead of fresh milk. Further, I have good grounds for belief that the only cases treated in that hospital with pasteurized milk are these same three that developed the periosteal bone. It is a natural inference then, so far as any inference from such a small number of cases as three is justifiable, that the antiscorbutic properties of fresh milk are much greater than those of raw meat juices, lemon juice, or any of the ordinary substances employed in the treatment of infantile scurvy.

NOTE ON A CASE OF OSTEOGENESIS IMPERFECTA (IDIOPATHIC OSTEOPSATHYROSIS).[1]

By J. S. Fowler, M.D., F.R.C.P.Ed.

OF EDINBURGH.

We owe our knowledge of the condition called osteogenesis imperfecta almost entirely to studies of fetuses, most of which have been still-born, and only a few have survived birth for some hours or days. It has therefore been generally assumed that the condition is incompatible with prolonged life, but I believe that this is not so, and that children suffering from osteogenesis imperfecta may not only survive birth, but reach adult life. Stilling in 1889, and Hildebrandt in 1899, described the disease fully, and their accounts of it practically agree with one another. Its distinguishing features are—(1) Extensive cranio-tabes, the vault of the cranium being sometimes nothing more than a membranous sac; and (2) great brittleness of the bones and multiple fractures, with the masses of callus where union has occurred. As the ribs are very frequently broken, spurious beading is often present, and this associated with the cranio-tabes, seems to be the reason why such cases have erroneously been regarded as true intra-uterine rickets. Apart from the two signs mentioned there seems to be no other constant one; in some, but not all cases the limbs are said to have been short, the nose broad and flat, and the body obese. The morbid change is definitely known. It is limited to the diaphyses and bones of the cranial vault, and consist in an abnormally increased size of the primary marrow spaces without equivalent deposit of new bone by osteoblasts. It should be noted that there is no abnormality of ossification either of the base of the skull or of the epiphyses of the long bones. It is thus a complete contrast to achondroplasia. Ballantyne describes fetal bone diseases as of four types only, of which two appear to be osteogenesis imperfecta and two achondroplasia. If, then, achondroplasia and osteogenesis imperfecta do not between them cover the whole range of diseases of the fetal skeleton, they are at least by far the most common of these maladies.

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[1] Edinburgh Medical Journal.

CASE.—In April, 1899, I was asked to see the 4-days' old baby of healthy parents, which had been born naturally at term without assistance. On the morning of my visit a painful swelling of the left thigh had been noticed. The child was a healthy, well-developed infant; the bridge of the nose was perhaps a little broader than usual, but otherwise the baby was well proportioned. The cranium was very imperfectly ossified; the anterior fontanelle measured about four finger-breadths, the coronal, sagittal, and lambdoidal sutures gaped, and the occiput was almost entirely undeveloped. The whole skull was extremely soft and yielding. There was a fracture of the middle of the left thigh, with very evident crepitus. No signs either of rickets or of intra-uterine fractures were present. The cause of the fracture was unknown; no accident was known to have occurred. The fracture was set, and united quickly with the formation of a large mass of callus, and by the time the child was 7 weeks old could scarcely be distinguished. At this date there was hardly any advance in the ossification of the cranium, but by the 14th week the head was very much firmer; the coronal sutures were closed, the posterior fontanelle could just be detected, while the lambdoidal sutures were about ¼ in. wide at their lowest part. At 3½ months old the child fractured his left humerus, at 18 months the left femur, at 21 months the left humerus, at 24 months the left humerus again. During his third year he fractured his right humerus twice—that is, he sustained seven fractures up to the age of three years, since when I have lost sight of him. In all cases the bones were broken as the result of very trifling violence; the fractures were attended by considerable pain, but united well. The child was breast-fed, and dentition began at 6 months. He did not walk until nearly 2 years old—this partly on account of the fractures. He was a year old before the back of his skull was properly ossified, and at the age of 2 the anterior fontanelle measured ¾ in. across. He never showed any signs of rickets. The hands were quite normal in appearance. At 3 years old he was somewhat small for his age, measuring 31 in., as against the average of 35.

The case I have related corresponds exactly with what is called in still-born fetuses osteogenesis imperfecta. It also agrees closely with idiopathic fragilitas ossium. Crozier Griffith in 1897 collected records of fifty-seven cases of the latter disease, but no one seems at that time to have connected it with osteogenesis imperfecta. The reason for this is, apparently, that the condition of the head at birth has escaped notice, either because the patients did not come under observation early enough, or for some other cause. In none of Griffith's cases is information on this point available. The conclusions to which I have come are—(1) Children suffering from osteogenesis imperfecta may survive; (2) the condition is recognizable clinically by the association of brittleness of the bones and cranio-tabes; (3) osteogenesis imperfecta and idiopathic fragilitas ossium are two names for the same disease.

A question worthy of further inquiry is whether, apart from shortening due to fractures, osteogenesis imperfecta leads to any dwarfing in later life.

Since the above note was written, a paper by Nathan has appeared,[1] in which similiar views are expressed, and Hohlfeld[2] describes a case like mine under the title Osteogenesis Imperfecta. The most conclusive evidence of the identity of the two diseases is, however, afforded by Looser's recent study of the morbid anatomy of idiopathic osteopsathyrosis,[3] from which he found that the microscopic appearances of the bones were exactly similar to to those characterizing osteogenesis imperfecta.

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[1] Am. Jour. Med. Sc., Philadelphia, January, 1905.
[2] München. med. Wchnschr., Feb. 14, 1905.
[3] Mitth. aus d. Grenzgebieten d. Med. u. Chir., 1905, Bd. xv. Hefte 1 and 2.

THE PROGNOSIS IN POSTERIOR BASIC MENINGITIS.[1]

By O. Hildescheim, M.D. Oxon.

Posterior basic meningitis is by no means so rare a disease as is generally supposed. It accounts for one-third of all the cases of meningitis which occur among the in-patients at Great Ormond Street Hospital—133 out of 396 consecutive cases. Some account of the general prognosis in this disease, therefore, may be useful, the more so since there is no illness in which it is more difficult to forecast the future. This difficulty arises in chief from the frequency with which the inflammatory exudate interferes with the circulation of the cerebro-spinal fluid, giving rise to some degree of hydrocephalus. The symptoms of concealed hydrocephalus have been described elsewhere.[1] They were divided for purposes of description into four groups.

1. Sudden deaths; relapse; sudden attacks of vomiting, headache, and pyrexia.
2. Convulsions; insanity.
3. Paralysis; retarded development.
4. Inability to gain flesh, headaches, incontinence, peculiarities of temper, morals, or emotions.

There are however, certain other sequelæ which cannot be ascribed to hydrocephalus, which must be considered in some detail before we proceed to a general survey of the prognosis.

AMAUROSIS WITHOUT OPTIC NEURITIS.

This is the most remarkable of these. Carr[2] does not mention this condition. Lees and Barlow[3] say: "Although optic neuritis is rare yet blindness more or less complete is not uncommon," and they cite cases. Stephenson in 1902 reported from the Royal London Ophthalmic Hospital 4 cases of "fleeting amaurosis in infants presenting symptoms of meningitis."

In more than one-third of my cases the child was either blind or its power of vision was uncertain at some period of the disease. Of these, over 60 per cent., were under 6 months at the time of onset of the disease, showing that the condition is more common in younger patients. The oldest child was 2½ years. In most instances the blindness begins insidiously. In half my cases it was not recorded until more than a month after the disease set in. Generally the condition endures for a few weeks—from three to six weeks; sometimes it lasts much longer. In three cases it was present ten months, one year and two years respectively, but the following history presents my most remarkable example of the condition.

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[1] British Medical Journal.

Case x.—Aged 3 months. He "fell out of bed and injured his brain." In the next five weeks he had nine fits. A week after the fall he was found to be blind. He was an in-patient in three London hospitals. He remained blind for five years, and then sight gradually and completely returned. Two years later, at the age of 7, he began to talk. My own notes say: "Age 10. Can't walk. Legs slightly spastic. Big healthy-looking boy. Idiot. Very hilarious and good-tempered. Vision normal There was evidence in the old notes of an early hydrocephalus which became arrested.

Vision returns gradually. In one case two years after the illness the mother told me that, although the sight was perfect usually, yet "when the child is indisposed vision seems blurred." Stephenson gives an almost identical description. Six months after the attack "the sight seems to fade away when the baby is poorly." The fundus oculi is usually pale, but otherwise normal. The condition is often referred to the excessive intracranial pressure so commonly found. The following facts militate against such a view:

1. There was other evidence of hydrocephalus in 29 per cent. of these cases, as against 36 per cent. of all my cases of posterior basic meningitis.

2. Blindness sometimes begins long before there is reason to suspect increased pressure—for example, Case IX became blind immediately after the onset of the disease. Eight months later the head was first noticed to enlarge.

3. The amaurosis disappears, although the hydrocephalus may be progressive.

4. The condition is not included in description of chronic hydrocephalus.[4]

The condition is probably never permanent. In only one case, which I was unable to trace, was the amaurosis persistent when the child was last seen.

OPTIC NEURITIS.

Optic neuritis does undoubtedly occur in posterior basic meningitis, but it is very rare. In many cases there are ill-defined appearances of some change in the fundus insufficient to warrant a diagnosis of neuritis. A necropsy of a case in which optic neuritis and retinal hemorrhages occurred is described in vol. xv of the Great Ormond Street records. It occurred in only one undoubted case in my series;[5] the boy's general condition, seven months after the attack, was steadily improving, but he remained totally blind.

PSEUDO-GLIOMA.

Lees and Barlow[6] describe one case; another has been recently recorded by Dr. Blaber.[7] I have two instances to add.

CASE LXXXIX.—The child was an out-patient, and the notes are scanty. About the third week, the right eye became affected. "Mr. Lister and Dr. Batten are agreed that the condition is probably a mild degree of pseudo-glioma." A year later vision is normal.

CASE XXXVIII.—Aged 1¾ years. An illness which was probably posterior basic meningitis. At the age of 2 years and 3 months he was admitted for fits and blindness. Well nourished; head retracted; legs strongly adducted. Whilst in the hospital hydrocephalus rapidly developed. Note by Mr. Lister: "In my opinion there is undoubted chronic iridocyclitis (pseudo-glioma)."

DEAF-MUTISM.

Apparently this condition is rare. Its frequency is apt to be overrated because it is quite common in certain epidemics of cerebro-spinal fever. I have found only two cases, of which one (Case XXXIX, loc. cit.) developed the condition after several operations for subdural drainage.

CASE XXXIV.— Aged 2½ years. Posterior basic meningetis. At the age of 2 years and 10 months, in hospital, "comparatively well, but is not sane; her memory gone; she does not know her people ; she is dirty in habits; her mother thinks she does not see at all. The child is an idiot." At the age of 6 years and 10 months the father writes: "I am pleased to state she enjoys the best of health, and appears to have all her faculties. I am sorry to say she cannot speak, and her hearing is very dense."

INSANITY.

Insanity is not very uncommon, and it often lasts for some months. Consequently the patient is often sent from the hospital *in statu quo,* and this has given rise to the idea that the condition is not rarely permanent. I have records of three such cases where the child ultimately became quite sane. My only permanent cases are the idiot child described above (Case x), and another who had frequently recurring fits during the two years that she survived (Case xxx, loc. cit.).

GENERAL PROGNOSIS.

Out of 133 cases in which the diagnosis of posterior basic meningitis was made, 43 were sent out of hospital alive. This does not indicate that one-third of all the cases recover, because:

1. The more severe cases are now more commonly sent to hospital.
2. Mild cases are treated in the out-patient department.
3. Many of those who are sent out alive die subsequently.

Probably the survivors of the original illness number considerably more than 1 in 3, whereas in distinctly less than one-third of all the cases can ultimately recovery be expected.

(*a*) I was able to follow up 17 patients who were sent out "cured." None of these patients have died, although the history, with one or two exceptions, extends over several years; 8 are completely cured; 5 have very minor troubles, which may be of no significance; 2 belong to the group "retarded development" (Cases LXIX, LXXXVIII, loc. cit.). There remain 2 who have developed hydrocephalus since leaving the hospital, but neither of these was really normal on leaving—one was still frequently vomiting, and in the other the limbs were still slightly spastic—so that one may conclude that once a child appears to be *completely* cured of the disease the prognosis is very good; but when one turns to those who were sent out "better" or "improved" the outlook becomes distressing.

(*b*) Out of 7, only 3 survive. Of these, 1 has hydrocephalus, another is paralyzed, and the third shows "retarded development"; at 3½ she cannot walk alone; 4 died, 1 from scarlet fever (the exanthemata not infrequently carry off these patients during convalescence), and the other 3 from the disease itself or its sequelae.

(*c*) Out of 13 cases sent out "*in statu quo,*" 4 developed hydrocephalus whilst in hospitals; 2 others died of "water on the brain" subsequently; 1 died of the disease itself, and 1 of measles; 3 are permanently disabled, and only 2 are cured.

It is almost impossible to give any prognosis early in the disease. One can judge of the severity of the infection by the pyrexia, spasticity, mental condition, amount of vomiting, presence of fits, and so on; but the very mildest cases sometimes develop hydrocephalus and in one fatal case which I saw there was for many days some inflammation about the joints before there was any indication of intracranial disease. On the other hand in Case xci, which represented the very worst type, the patient was seven months later steadily improving, and many of the patients that ultimately recovered were ill for several months.

It is well known that the prognosis is better the older the child. Nevertheless, one-third of my patients who completely or partially recovered were under 6 months at the time of onset.

In conclusion, it should be recognized that the prognosis largely depends, in not a few cases, on careful and unremitting attention to the artificial feeding of the child; the value of this process should be regularly checked by weighing the patient, and every effort should be made to avoid setting up a catarrh of the nasopharynx and respiratory system.

REFERENCES:

[1] Hydrocephalus and Posterior Basic Meningitis, The Practitioner, August and September, 1905. [2] Med. Chirurgical Trans., 1897. [3] Simple Meningitis in Children, Clifford Albutt's System of Medicine. [4] Brain, vol. xiii. [5] Case xci, loc. cit. [6] Loc. cit. [7] Lancet, November 4th, 1905.

A CASE OF POSTERIOR BASAL MENINGITIS WITH FEW CEREBRAL SYMPTOMS[1]

By J. G. G. Corkhill, M.D., L.R.C.P.

The following case possesses much interest from the almost entire absence of symptoms. Certainly there were none of the classical ones present and their absence gave rise to great difficulty and delay in diagnosis. The onset was similar to that of one of the zymotic diseases, and though these one and all were eliminated by time, there was nothing of a very definite nature pointing to the condition of the brain until very late in the case.

The entire absence of headache, the slight amount of vomiting, the absence of head retraction and rigidity and of Kernig's sign made a positive diagnosis well-nigh impossible, and caused much anxiety alike to the parents and the medical attendant.

V. S., female, aged 2 years and 2 months, was always a robust child, weighing at birth slightly over 9lb.; the head somewhat large. Twelve months ago she had a sharp attack of vomiting which lasted three or four days; with this exception she had always been strong, healthy, bright, and intelligent.

FAMILY HISTORY.

Some thirty years ago one of the father's sisters was said to have died of "water on the brain;" with this exception, all members of the father's and mother's families were strong and healthy.

HISTORY OF ILLNESS.

On January 20, suddenly vomited and appeared to be ill; the vomiting was nothing more than undigested food. The child, seen in my absence by my friend, Dr. Brown, seemed to have a cold in the head. The temperature was 102°, though four hours later it had risen to 104.4°; respiration 60, pulse 160; no examination was then made, as the child was sleeping well and peacefully.

On January 21, the temperature was 103.2°, respirations 50, pulse 148. The bowels were constipated, and the tongue coated with a thick white fur. There had been no further vomiting. Careful examination showed lungs, heart, and kidneys healthy; the abdomen was distended. Child bright and intelligent, making no complaint, though wanting to be put back to bed during the examination.

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[1] British Medical Journal.

On January 22, temperature varied from 102° to 104° F., respiration was hurried and somewhat of the Cheyne-Stokes type; the bowels had been well moved, the motions being slimy and green, and containing much curd. Examination proved negative.

On the morning of January 23, the condition was much the same; but in the afternoon I was called by the parents, as they noticed that she had become "strange," lying on her right side looking vacantly towards the right, and no longer "taking notice," though answering questions when spoken to; there was some paresis of the external rectus; the pupils reacted readily to light, and were neither dilated nor contracted; there was no retraction of the head; she had vomited curdled milk. I ascertained that two quarts of milk were being given in twenty-four hours, and ordered one pint of whey instead.

On January 24, I saw her with Dr. Ashby; the result of the examination was negative. Temperature, pulse, and respiration much the same; there was no optic neuritis; no diagnosis was made.

On January 25, the child had improved in general condition, and was playing with dolls, though the temperature rose to 104° towards evening. From this date till February 1, the condition remained very much the same; the temperature was easily controlled by phenacetin gr. v whenever it rose to 101° then it rose suddenly to 106.4° at 5.30 p.m., though at 8.30 p.m., it was normal. The child was intelligent, doing as told, and answering questions. The paresis of the external rectus had disappeared on January 27. The bowels were moved during this time three or four times in twenty-four hours. The motions were somewhat loose, with more or less slime, but in color became more natural. Some spasmodic pain in abdomen, which was distended, was complained of. Examination of the blood for typhoid gave a negative result.

On the morning of February 5, the child was much as before, but at 12.30 p.m., I was hurriedly called as the breathing had become "strange." There was marked rigidity of arms and legs; the pupils were dilated, but reacted to light, and there was no optic neuritis. The temperature was 105.4°, the pulse small and too rapid to count; tepid sponging brought the temperature to 101° in half an hour, and the rigidity passed away entirely with the fall of the temperature. In the evening the temperature was normal.

On February 6, I had further consultation with Dr. Ashby. The child was bright and intelligent, the temperature as before. Lungs and heart were normal, and the bowels as described above. No diagnosis was made.

On February 8, the temperature ran up in the afternoon to 105.6°, but fell rapidly after sponging. In the evening the child was dull, taking no notice; the pupils reacted very sluggishly. There was slight retraction of the head.

On February 9, the general condition was much the same, though there was more marked listlessness and some rigidity of the upper cervical muscles.

On February 10, the child was comatose, or almost so, rigidity of the head and neck being very marked. I had a consultation with Dr. W. B. Warrington, of Liverpool. The condition much the same as on the previous day. Kernig's sign was absent, lumbar puncture was advised, about 1 drachm of turbid fluid was drawn off; when dried and stained with methyl violet it showed many multinuclear cells and small diplococci.

On February 11, the right arm and leg were rigid, and later in the day the jaw became so rigid that she could not be fed. This rigidity of jaw passed away on the following day, but the limbs on the left side became rigid, and the spine so much so that she could be lifted by the hand under the occiput.

On February 13, after a good morning and a show of marked improvement, she suddenly vomited at 5 p.m., and half an hour later, after some grinding of the teeth, and one or two convulsive movements, died.

SOCIETY PROCEEDINGS

SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN

Special Meeting, December 15, 1905

Dr. Leonard Guthrie, Chairman

"Pleural Effusions, both Serous and Purulent," was the subject of this meeting, and Dr. J. G. Emanuel opened the discussion of the pathology and bacteriology. He said that whereas in adults the proportion of purulent to serous effusions is about one to four, in children they are equally frequent. In children, too, the purulent effusion is generally such from the first, instead, as is common with adults, of being secondary to a serous one. He finds that three out of four empyemata are pneumococcal, and may be primary or secondary to a pneumonia, these latter occurring either during the progress of the pneumonia or subsequently to it. Streptococcal empyema is not uncommon among adults but rarely found in children. Staphylococcal empyema is often a sign of tuberculosis, but when pulmonary tuberculosis is complicated by empyema it will usually be found to be either pneumococcal or streptococcal. A pneumococcal empyema may appear localized to the pleural cavity or may give rise to pericarditis, peritonitis and the like through infection by way of the lymphatics, or to meningitis, endocarditis and the like through infection by the blood stream. Dr. Emanuel spoke of pseudoempyema in which the pus collects behind the parietal pleura, and mentioned phagocytosis as an indication of the virulence of the organism. He stated that there is no essential bacteriological difference between serous and purulent effusions. He spoke of the difficulty of distinguishing between pleural transudations and exudations, and discussed the bacteriology of idiopathic serofibrinous effusions, cytodiagnosis, rheumatic pleurisy and pleurisy due to the typhoid bacillus.

Mr. Lockhart Mummery spoke on the treatment of the condition under discussion. He divides empyema in children into two classes, those of a purely pneumococcal infection, by far the greater number, and those of a mixed septic or tuberculous infection. In the former the only thing necessary is a free exit for the pus. Often the drainage tube is not required, and it seldom has to be used long. In the latter class, and when the pleura is thickened, good drainage is required. He emphasized the necessity of careful asepsis to avoid the danger of secondary infection. For anesthetic he prefers the C. E. mixture of light chloroform and oxygen. He warned against allowing a large empyema to empty too quickly, and advised irrigating the pleural cavity with water or salt solution in suitable cases, believing that the fatalities sometimes attending irrigation are due to the use of iodine or carbolic solution. He also attaches great importance to the after treatment, warning against tight bandages or heavy bed clothing, which might restrict thoracic movement, and advising exercises to re-expand the lung.

Dr. G. A. Sutherland spoke of the symptoms, mentioning their slightness or even absence in many cases where the effusion was not excessive. Careful examination of the chest, determining the position and condition of the heart and lungs was necessary to a diagnosis, but certain symptoms were common, breathlessness and susceptibility to fatigue, for instance, also coughing, pyrexia, wasting and anemia. Purulent effusion was sometimes indicated by a lemon-colored skin and clubbing of the fingers developing rapidly and without cyanosis. The exploring needle was useful not so much to determine the presence of effusion as to enable the physician to distinguish between serous and purulent effusion.

Dr. Hobhouse affirmed that whereas in the early stages effusion could be prevented and pleurisy cut short, he did not think this possible by medical measures once the effusion was fairly started. Some practitioners tried to increase the fluid output and decrease the intake by a thirst diet, diaphoretics and diuretics, but the results scarcely justified the discomfort entailed. When the effusion did not yield to reasonable medical measures puncture should be resorted to.

Dr. W. J. S. Bythell in discussing the bacteriology said for some years he had been conducting an investigation with a view to determining the source of infection of the pleura, the species of micro-organism and the influence of the bacteriology on the clinical aspect of the disease. He had studied forty cases in children between ten months and eleven years of age, twenty-seven boys and thirteen girls, and found that in over eighty per cent. an acute broncho-pneumonia was unmistakably the source of infection. In ten per cent. it was acute pneumococcic infection of a pre-existing pulmonary tuberculosis. In six cases the empyema was apparently primary, and in one it followed a sarcoma of the lung. Ninety per cent. of the cases studied were pneumococcal or pneumococcal and streptococcal. Most authors maintain that the streptococcal empyema is apt to be much more severe than the pneumococcal, a view which Dr. Bythell's observations did not entirely bear out.

Dr. William Ewart reported a case occurring in a boy ten years old and treated by paracentesis by syphonage with admission of air into the pleural cavity. A recurrence took place, and was successfully treated by intra-pleural injections of adrenalin solution without paracentesis.

Mr. L. S. Dudgeon said that for five years he had made frequent examinations of the fluid drawn off, and believed this a very valuable method. A clear effusion with the cells consisting almost entirely of lymphocytes was good evidence of a tuberculous infection. If polynuclear phagocytes were found the empyema was due to one of the pathogenic organisms. In one case he found a great many cells showing active myototic figures, and a subsequent autopsy revealed a diffuse sarcoma of the chest cavity and pleura. In many cases which came to autopsy he had obtained a pure culture of pneumococcus from blood drawn off in a sterile glass syringe after death. In four empyemata developing in cases of bone abscess he obtained a pure culture of staphylococcus pyogenes aureus. He thought that observers should be more careful in talking about streptococcic infection. Some people would give antistreptococcic serum whenever they recognized a few cocci forming a chain. As a matter of fact the identification of these streptococci was very difficult. He was working on this subject with organisms from scarlet fever and streptococcus pyogenes aureus from a general hospital, and three weeks or a month was necessary to identify those streptococci. This fact precluded any clinical value of the identification, since by that time the patient would probably be either dead or well. The profession must be cautious in labelling things as streptococcic too readily. Mr. Dudgeon also reported a number of interesting cases.

Dr. George Carpenter gave statistics of 190 cases of pleurisy with effusion under his care. 114 of the patients were males, 76 females. 85 of these cases were fibrinous, 48 being right-sided, 36 left-sided, and one double. There were 105 empyemas, 50 right, 53 left, and two double. 114 of these patients were less than six years old and of these 75 developed empyema. 31 of those with empyema died, and 7 of the fibrinous cases terminated fatally. A sudden, sharp, febrile attack characterized the onset of many cases, and in about 10 per cent. a history of preceding exposure to cold or wet was obtained. A few gave a history of traumatism. The quantity of fluid obtained by aspiration was variable. He had never obtained more than 46 ounces in a simple effusion, but Heyfelder had taken six pints from a patient of about the same age as his, namely six years. On an average 8 or 10 ounces of pus were caught at the time of operation, more draining away subsequently. Physical signs of consolidation of the upper or middle and upper lobes with deficient or possibly absent vesicular murmur over the lower lobe constitutes a common clinical type. In another, dulness from apex to base of chest may be noted with good but distant vesicular breath sounds, or distant tubular breathing. This may be heard on a deep breath only and only on expiration. Distant vesicular breath sounds with moist rales may be detected. With this extreme effusion there may be apical resonance or hyper-resonance, the breathing clear and distant, expiration prolonged and disproportionately audible. Over the root of the lung and its immediate neighborhood a sector-shaped area of resonance may be detected. Dulness over the lower lobe and deficient entrance of air characterizes another type. Occasionally the breath sounds are distantly tubular. Loud tubular breathing at the upper limit of dulness may be noted, with or without friction sounds, sometimes with friction sounds only, sometimes with pneumonic crackles only. Sometimes skodiac resonance can be found in front over the corresponding apex, above the clavicle or below it or both, and occasionally behind. In basic consolidation as well skodiac resonance is noted. On the healthy side the breath sounds are extra-puerile. Fluid may be present even if percussion does not give dulness of a fluid character. Broncophony contra-indicates fluid. Fluid in the chest may be indicated by a thickened pleura. Displacement of the cardiac impulse is an important item in diagnosis. Obliteration occurs in certain cases, as does also fluctuation, and occasionally edema. Puffiness of the face and eyelids has been seen. Only one of Dr. Carpenter's patients had clubbing of the fingers and toes, and this one had been sick for two years. To temperature as a means of distinguishing between pus and serum, he attaches no importance whatever, but holds that an effusion following an exanthem and associated with diarrhea, sweating, a sallow complexion and wasting is apt to be purulent. Exploration is necessary to determine positively. There is no danger in passing an exploring needle into a pleura full of fluid, but there is great danger in passing a needle into a cirrhotic lung, and there may be danger in wounding a pneumonic lung. Dr. Carpenter's empyema cases were treated by incision in the seventh or eighth interspace, just outside the angle of the scapula. In most of them a simple incision sufficed, but in some a couple of inches of rib was taken out and in two or three cases Estlander's operation was done. A rubber drain was used until the discharge became serous, usually for about a week or ten days. Dr. Carpenter approves of the removal of a portion of rib, as it provides opportunity for digital examination and assists drainage. If the case is putrid, however, the exposure of cancellous bone is inadvisable. A rise of temperature on removal of the tube does not necessarily mean imperfect drainage or re-accumulation. In a number of cases it was accounted for by intercurrent disease and in some apparently by a small superficial collection of pus about the wound. When the discharge becomes slight and serous an attempt shoulde be made to bet rid of the tube, even if there seems still to be a cavity of considerable extent. Dr. Carpenter thought that the patient should be gotten out of bed as soon as practicable after the operation. In cases of small empyemata the patient may recover by aspiration repeated one or more times, but he thinks the disadvantages of this method outweigh the advantages. With simple effusions, in case the pleural cavity is full of fluid, immediate aspiration is indicated. If simple fluid is left untouched in the chest for more than three weeks the lung is apt to contract adhesions. When fever is present aspiration should not be done, lest reaccumulation occur. As soon as the child begins to cough, aspiration should stop. He also warned against the use of a sharp, hollow needle. He had seen many cases successfully treated by limitation of the fluid intake to a half pint daily with food as dry as possible. Iodide of potassium had seemed to have some value given internally, and Scott's ointment applied to the chest.

Mr. Arthur Edmunds presented an apparatus designed to show the importance of making the opening into the chest sufficiently free.

EDITORIAL

BEGINNING FARTHER BACK

That the general American public is beginning to accept the teachings of the medical profession as to the nature of tuberculosis and the necessity of its prevention is a happily undeniable fact, but, as so often happens in reform movements in any direction, the children, who actually offer the most hopeful field for effort, are rather overlooked in the matter. Just how many children in this country are predisposed to tubercular disease can be the subject of only the most loosely formed estimate, since no statistics are available on this point, but that the disease in a latent form is present in a deplorably large number cannot be denied. In Germany, however, some investigation of the subject has been carried on, and although the higher death rate from tuberculosis which that country presents as compared with our own probably extends proportionately to the child population, the figures given may still be quoted as an approximate guide to the seriousness of the question. The test adopted was that for agglutination of tubercle bacilli by the blood of the subject tested. Salge found by this means that 12.5 per cent. of children under the age of one year and showing no other signs of the disease furnished blood capable of agglutinating the bacilli, and as the children grow older the percentage increases. It must be admitted that this test for tuberculosis is not recognized as a conclusive one, but the increase in percentage with age is a significant fact in its support, as is also the greater percentage noted among children with scrofulous tendencies or even among those with adenoids, chronic inflammation of the mucosa, etc.

As might naturally be expected, the number of children showing signs of latent tuberculosis increases among those of school age. It would be almost impossible to find any public school in which conditions are such as materially to aid a child in the struggle between the infection and his resistance to it, and in too many cases the confinement in the school room is likely to be directly enlisted on the side of the disease. This is especially true in just those districts where the percentage of latent tuberculosis is of necessity highest, in those, namely, where the children come from poor families, living in crowded, unsanitary surroundings. There is little hope for such a child in such environment, and it would seem the part of wisdom for the community to choose promptly between an effort to reform the environment and the necessity of taking charge of the child in later life when the disease has completed its mastery and removed him from the ranks of the producers.

As is justly pointed out in a recent issue of the *Journal of the American Medical Association*, public responsibility for conditions in the school room cannot be blinked, whatever theories one may hold on the subject of tenement and factory inspection. Yet, in spite of elaborate systems of ventilation, how many school rooms can one enter at the close of the day's session without being forcibly reminded of the remark of the old college professor at the end of his lecture, when his audience had filed out and he turned to his assistant with the request: "Mr. Brown, kindly open the windows and let out the rest of the senior class."

The cleaning of floors and walls, also, is too often of the variety colloquially described as "a lick and a promise," and the resulting dust adds an irritating and dangerous element to the overtaxed atmosphere. The sooner the public realizes these facts the sooner will it find the opportunity of attacking the great white plague where there is the best chance of winning, and will avert the necessity of many a losing fight at a later day.

It is interesting to note, in this connection, that Dr. Vautier, of Paris, in a recent paper in the *Revue d'Hygiene et de Medicine Infantiles* has reached the following conclusions: "In the common schools of Paris, tubercular contagion appears to us to be very rare. This contagion may be produced in a family during the school age, but even that is not frequent. The number of children of school age, who have clearly pulmonary tuberculosis is very small. Children, in a great majority of cases, at least among the poor, are infected by latent tuberculosis at the time of their entrance into school."

He therefore proposes the following rules and regulations:

1. Add to the instructions given relative to the construction of school buildings, a rule favoring facing the building so that the sun's rays may penetrate the class rooms and the courts.

2. Replace wooden floors by those without joints in schools to be built and if possible, in those already built.

3. Exclude children who have evident tuberculosis, except that surgical tuberculosis may be so protected by air-tight dressing as to be safe.

4. Send away members of the teaching force who have evident tuberculosis, or put them in places where they will not come in contact with children.

5. Have school-rooms often thoroughly cleaned.

6. Seek to increase the strength of children by walks and games for which open lawns are necessary. Fortifications or the space about them are all that is necessary.

7. Insist that the school-masters advise cleanliness and if need be, require it, and that they make it possible for them to know the meaning of a bath.

8. Insist on obtaining from the boards of health, proper aeration and size for homes and disinfection of places occupied by bacillus-bearing tuberculous patients, specially at the time between the departure of the infected family and the entrance of another family.

9. Invite the school boards to consider the matters of better food for the children, furnishing a meal to many of them and making arrangements for free medicines, specially those prescribed by the attending physician.

10. Send children convalescent from acute sicknesses, specially those likely to become tuberculous: measles, pertussis, etc., to special institutions in the country.

11. Establish seashore hospitals at convenient places, where tuberculous children may stay six months or a year, and receive suitable treatment.

ABSTRACTS

Acid Auto-intoxication in Infancy and Childhood.—Morse (Archives of Pediatrics. Vol. xxii., pp. 561-571.)

Langstein and Meyer found that in children from 6-14 years of age on a meat diet without carbohydrates, relatively more acetone is excreted than in adults, and not through the urine as in adults, but principally through the lungs. Other experimenters showed that the acid bodies are present in the urine of infants and children under approximately the same conditions as in adults; often in acute high-pyrexial diseases, varying as a rule directly with the height of the fever, and disappearing with it. Meyer, however, claims that acetonuria in the infectious diseases is independent of the nature or intensity of the infection, and is due solely to carbohydrate inanition caused by the diminished power of carbohydrate metabolism in those diseases; that in some instances, especially in typhoid, the acid bodies may persist or first appear during convalescence, being then probably due to insufficient food or carbohydrates.

Morse states that the acid bodies are enormously increased in children during convulsions, but probably not as an exciting cause, as they are absent or present in only small traces in the urine of diseases in which convulsions are most common. The effects of starvation and variation of diet in the production of acetone bodies are probably essentially the same in children as in adult life, although more marked in the former, and in infancy the bodies do not appear from starvation as soon as in later life. Vergely found that the cessation of the gastro-intestinal symptoms and the disappearance of the acetone bodies from the urine were simultaneous. He divides the symptoms into nervous and gastric. The nervous symptoms are change of disposition, excitability, restlessness, irritability and insomnia; the gastric, anorexia, vomiting, thirst and constipation. He concludes that these digestive troubles have a peculiar symptomatology which is due to the presence of these acid bodies. The acetone bodies are very rarely found in the urine of the chronic gastro-intestinal disorders of infancy. Morse contrasts this with those cases in children in which acetone in the breath and urine is frequently present in the acute and chronic disorders of the gastro-intestinal tract. In many children under his care the odor of acetone in the breath was an early warning of an attack of indigestion, with or without the acetone bodies in the urine, and often with the odor were marked restlessness and irritability for some days before the development of other symptoms. The use of sodium bicarbonate often aborted or prevented impending attacks. The acid bodies cannot be due to starvation, as they are present when enough food and a proper relative amount of carbohydrate is being taken. Acetone bodies may be present without symptoms of acid intoxication, which suggests that the latter is not the only cause of the symptoms. They are not formed in the intestines, although the primary cause is almost certainly there, introducing derangements which cause complex nutritional disturbances resulting in the formation bodies.

In vomiting associated with the acetone bodies the acetonuria and acetone in the breath often precede the vomiting. Sodium bicarbonate relieves or aborts the attacks, and dieting has no effect. The severity of the symptoms is quite out of proportion to the gastric disturbance. Signs of acid intoxication before the vomiting, the association of the two conditions and their simultaneous disappearance suggest that they are intimately connected. The fact that vomiting can be controlled by the use of soda, the antidote for acid intoxication, shows that it must be due, in part at least, to the acid intoxication. It is probable that the origin of the acid intoxication is not the same in all cases. Recurrent vomiting may occur without evidence of acid intoxication, but this does not prove that the latter has no causal relation to the attack, nor that the association of evidences of acid intoxication and vomiting is pathognomonic of recurrent vomiting, as shown by a patient who afterwards died from tuberculous meningitis.

Brackett, Stone and Low reported cases in which vomiting, collapse and acetone in the breath and urine occurred in children in the surgical ward of a hospital. All the children had extensive muscular atrophy as a result of paralysis or mechanical treatment. Autopsies in four cases showed extreme fatty degeneration of the liver and muscles. The symptoms were attributed to acid intoxication, and the source of the acid was supposed to be fatty degeneration. The appearance of acetone in the urine was regarded as an indication of serious disturbance of metabolism when it was present in sufficient quantity to give an ordinary clinical reaction. The amount of acetone excreted in twenty-four hours in one of these cases was 142 mgm., much more than the normal, but very much less than in diabetics, in whom it often reaches 100,000 mgm.

A Study of Leucocyte Counts in Fifty Cases of Broncho-pneumonia, Lobar Pneumonia and Empyema in Children—HEIMAN (Arch. of Pediatrics, 1905, p. 734.)

A well-marked leucocytosis is present in the broncho-pneumonia of children. It is independent of the amount of lung involved, and stands in no relation to the height of the temperature. Though there are some exceptions, yet in broncho-pneumonia the general rule is that failure of the leucocyte count to drop when the pulmonary signs disappear indicates either a complication or a fatal termination of the illness.

A constant and considerable leucocytosis may regularly be expected in the lobar pneumonia of children. The degree of leucocytosis is about the same as in broncho-pneumonia (broncho-pneumonia: average leucocytosis in 19 cases, 33,900; lobar pneumonia: average leucocytosis in 24 cases, 31,700). It differs from that in broncho-pneumonia in that the white blood count is higher when the pulmonary involvement is greater. If in lobar pneumonia two or more lobes be involved, a relatively high blood count may be looked for. It furnishes no clue as to the height of the temperature.

An increasing leucocytosis is the general rule in the lobar pneumonia of children, reaching the maximum just before the crisis. While failure to drop before the crisis may indicate a complication, yet this may be of no special significance. The pre-critical drop in the lobar pneumonia of children is inconstant, of little or no prognostic value, and cannot be utilized as means of determining the time of crisis.

There is a high leucocytosis at the onset of empyema in children.

In general it may be said that the diagnostic value of the leucocytosis in the pulmonary affections of children is limited. In certain instances, however, the leucocyte count is of great diagnostic aid. When, for example, in lobar pneumonia, resolution and the drop in the leucocytosis have occurred, and there are present signs exciting suspicion that empyema will be a sequela, then blood counts should frequently be made at regular intervals. A sharp rise in the count, provided that other causes of leucocytosis can be excluded, is then strong presumptive evidence of a supervening empyema.

Epidemic Cerebro-Spinal Meningitis — FERRER (Medical Record, October 8, 1904, p. 569), SPEER (Medical Record, April 15, 1905, p. 561), ELSNER (Medical News, 1905, p. 638), STOCKTON (American Medicine, 1905, p. 519), HUBER (Medical News, 1905, p. 677), CHAUFFARD (La Presse Médicale, 1905, p. 281).

Dr. Ferrer writes on twenty cases admitted to St. Vincent's Hospital, ten of which terminated fatally. All his patients had pain in the head (severe as a rule), more or less fever, some degree of retraction of the head and rigidity of the neck, delirium of varying intensity at some period of the attack, and more or less leucocytosis. Constipation was the rule, but two patients had early diarrhea. Seventeen had vomiting at some time, usually at the beginning. Fifteen had general hyperesthesia, and in fifteen Kernig's sign was elicited. Other symptoms, such as chills, coma, spasms, etc., were less frequently met with. Lumbar puncture performed in eleven cases was positive in four, and negative in seven.

Dr. Speer deals with the epidemic which swept over Michigan, beginning in 1898. He states that the disease has occurred most frequently after long, severe winters, and as a broad statement it may be said to arise under those hygienic conditions that reduce the physical condition; thus fatigue mental worry, poor food, other illnesses, as well as overcrowding, etc., may all act as predisposing factors. It is, however, generally accepted that the diplococcus intracellularis is the bacteriological agent, most probably gaining admission by the nasal mucous membrane, but on account of the active manifestations of the disease being isolated within the bony structure of the skull, and of the minimum amount of secretions from the seat of disease, the opportunities for infection are very scanty. Dr. Speer believes that sporadic cases of cerebrospinal meningitis have the same etiology, the probable presence of the diplococcus in the cerebro-spinal fluid being limited to the early period of the disease, or the diminished opportunity for investigation explaining the hitherto negative evidence on this point. Reviewing the symptomatology, he draws attention to the tendency for the turning in of one or both feet, until one lies across the other, and points out that after signs of pressure have occurred, there may be an intermission, with improvement in all symptoms. This, however, is soon followed by a relapse, in which the opisthotonos reappears, and symptoms of pressure and paralysis of muscles have a tendency to become permanent. Most writers draw attention to the high morbidity and high mortality among children. Under treatment, Dr. Speer mentions the usual methods adopted, viz., hot baths, lumbar puncture, etc., and speaks highly of the use of sedatives, particularly opium, which is to be used in sufficient doses to maintain ease and quietness, since distortions disturb the natural relations of the parts of the body and their functions, and, as in the case of opisthotonos, by interfering with the flow of blood and lymph may increase the tendency to paralysis and coma, and hasten death.

Elsner goes more fully into the symptoms and diagnosis of cerebrospinal meningitis, and draws attention to the presence of other infectious diseases of the nervous system during the prevalence of even limited epidemics, as well as to the occurrence of "house-epidemics." In referring to herpes labialis, which is more frequently met with in Germany than in America, he quotes Ziemssen, who says: "In no other disease have I observed facial herpes which spreads so widely."

Speaking of limited tonic spasm, without full convulsions, which "is quite characteristic of the beginning posterior-basic meningitis of the English," he believes that the majority of these are undoubtedly cases of cerebrospinal meningitis. Vomiting, he finds, has characterized the cases with an unusually long prodromal period, but it is a less common symptom than in tuberculous meningitis. The Kernig phenomenon, he says, is present in almost all cases of cerebrospinal meningitis, and its early presence with a few brain symptoms has, on several occasions, created a strong suspicion of the disease, though it must be remembered that it is not pathognomonic, and that it is often absent in meningitis. "Taken alone," he says, "its value may be overestimated; when used as a link it adds great strength to the diagnostic chain." As regards lumbar puncture, he concludes that macroscopic and microscopical examinations of the fluid withdrawn can ultimately only serve to strengthen suspicions. The greater and scientific value in the differential diagnosis of the various forms of meningitis, cerebral and spinal, must depend upon the demonstration of the specific organism. He gives an interesting experience of two cases of typhoid fever, in which the symptoms during the first four to seven days were those of cerebral or cerebrospinal fever, and in reference to the question whether the typhoid bacillus may cause purulent cerebrospinal meningitis, he mentions Stäubli's investigation at the Munich clinic, where the ante-mortem and post-mortem refinements of diagnosis used permitted him to answer this point affirmatively.

In the same publication the eye symptoms of cerebrospinal meningitis are treated by Dr. A. Edward Davis.

Stockton reviews the treatment of the disease, dealing with (1) the hot bath; (2) lumbar puncture and drainage; and (3) subcutaneous injections of corrosive sublimate. Though a definite statement of their value is impossible, it is possible that the first two may be of service under certain conditions, but it must be admitted that the sanitarian is more useful than the therapeutist.

Dr. Wolff has stated "that there is a decided antagonism between the Klebs-Löffler bacillus and the meningococcus," and on this finding at the Beth Israel and Roosevelt Hospitals diphtheria antitoxin has been injected directly into the subarachnoid space, after previous withdrawal of 4 or 6 or more drachms of fluid by lumbar puncture.

Huber thinks that the results obtained are promising, though he reserves his judgment.

Chauffard relates the case of a boy, 19 years of age, which came under his own observation, and refers to the comparison made by Pinto (of Coimbra) between the meningococcus intracellularis and the gonococcus. This investigator finds that these two micro-organisms have many points of resemblance, and the suggestion is made that they may be generally connected.

Rapid Bacteriological Diagnosis of Diphtheria.—HIGLEY (Medical Record, 1905, p. 492).

The method which Dr. Higley describes is given more especially for workers in clinical pathology since the difficulty and care necessary in making proper and reliable smears from false membranes prevent it from being as reliable for diagnostic work generally as the cultures which are now in use. The identification of diphtheria bacilli in stained specimens depends especially on the following four points:—(1) the unevenness of their contour; (2) their mode of division; (3) their grouping; and (4) the irregularity with which they stain. To bring out these points in smears he uses a differential stain—No. 1, five drops of Kühne's carbolic methylene blue in 7 cubic centimetres of tap water, and No. 2, ten drops of carbol-fuchsin in 7 cubic centimetres of tap water. In carrying out the technique the smears must be as thin as possible; stain No. 1 must not be left on longer than five seconds; stain No. 2 must not be left on longer than one minute, nor shorter than 45 seconds; the smear must be thoroughly washed and dried before the application of the two stains, and both solutions must be freshly prepared before using.

Dr. Higley has also conducted an investigation into the best method of obtaining the smear, and finds that the use of a strong wire-looped needle, flattened at its curved extremity by filing so as to form a sort of curette, when drawn lightly over the false membrane and smeared in a drop of distilled water on each of several successive slides, gives the most reliable results.

The Diagnosis of Acute Pneumonia in Infants.—VARIOT (Gazette des Hôpitaux, July 20, 1905).

After remarking on the obscurity of the diagnosis of central pneumonia in children, the writer describes the symptoms usually met with. Oscillations of the temperature, fits of coughing at long intervals, slightly accelerated respiration, loss of appetite and weakness are often the only symptoms presented during the first four days. After five or six days a crisis occurs, but it is often followed by a temporary and inexplicable rise of temperature. In central pneumonia the symptoms are sometimes very late in appearing, as in the case quoted, where the physical signs did not become evident until the fifteenth day. Rigors are not noted, pain is frequently abdominal in character, and may be misleading, while dyspnea and accelerated breathing are often absent at first. The cough is slight in the early stages, and any expectoration is swallowed. The difficulty of obtaining a specimen of the sputum may be readily overcome if a fit of coughing is provoked by depressing the back of the tongue and a pledglet of cotton wool on a probe dipped into the mucus brought up. The presence of the pneumococcus points to a favorable prognosis. The symptoms of central pneumonia may simulate those of typhoid or meningitis, and a diagnosis may be possible only when the crisis has occurred. The writer lays stress on the frequency of cerebral symptoms, which may be very severe. With M. Chicotot he has conducted some investigations as to the value of the radioscopic examination of the chest in the diagnosis of pneumonia, and has met with considerable success. A central pneumonia, which may give rise to no physical signs on auscultation or percussion, can be readily diagnosed by the shadow thrown on the screen. The differential diagnosis between croupous and broncho-pneumonia is rendered less difficult when it is noted that dyspnea, acceleration of the respiration and cyanosis are more common in the latter and a definite shadow is given by a radioscopic examination in the former.

The Leucocytes in Whooping Cough.—GRULEE AND PHEMISTER (Archives of Pediatrics, 1905, p. 595).

From an investigation of fifteen cases of whooping cough, the writers state that a leucocytosis is usually present in all stages of the disease. The number of leucocytes ranged from 12,500 to 48,500 per c.m.m. in the cases examined, and varied directly with the frequency and severity of the paroxysms. The mononuclear leucocytes were relatively increased in all stages of the disease. This leucocytosis is present in the catarrhal stage, most marked in the active stage and gradually disappears. In the paroxysmal stage the lymphocytosis was due largely, in the case reported, to the large lymphocytes. In one case examined in the catarrhal stage the small mononuclears were in excess.

Congenital Hypertrophic Stenosis of the Pylorus, with an Account of a Case Successfully Treated without Operation.—HARPER (Lancet, August 19, 1905).

A case of congenital hypertrophic stenosis of the pylorus with recovery under medical treatment is worth recording. The baby—a boy—was fed on small quantities of peptonized milk at very frequent intervals, and injections of half a pint of normal saline solution were administered per rectum twice daily. The latter treatment was of much use in counteract-ing the great drain upon the tissues which resulted from the excessive vomiting in the case. The writers deserve great credit for their treatment of the child, for they persevered through many disheartening symptoms, such as convulsions and very obstinate constipation. Surgery would almost certainly have resulted in the child's death. They think that in any future case they would certainly wash out the stomach twice daily as a routine measure, in the probability of avoiding convulsions from stomach irritation. The child's condition in July, 1905, when he was 13 months old is interesting. He weighed 26¼ lbs. "He appeared to have an unusual amount of adipose tissue for a child of his age, and the upper part of the abdomen looked unduly prominent. Nothing abnormal could, however, be detected. His health is excellent and his appetite is good. He never has any vomiting and has cut several teeth. Constipation, however, still remains a difficulty."

The Treatment of Inguinal Hernia in Infancy and Childhood.—Dun (Medical Press and Circular, June 21 and June 28, 1905).

This paper is based upon upwards of 200 cases of reducible inguinal hernia, seen by the author at the Liverpool Infirmary for Children. Ninety-seven per cent. of the children affected were males, and 70 per cent. of these boys were ruptured on the right side. In 12.5 per cent. obliteration of the funicular process had not occurred, and the ruptures were noticed immediately after birth. In 65.5 per cent. the ruptures appeared at some date between the end of the first week and the end of the third month of life. From this date up to the twelfth year hernia appeared in only 18 per cent. of the author's patients. In 121 cases where a hernia appeared between the second week and the end of the third month, the author considered that gastro-intestinal disturbance was the exciting cause in 42, and in 9 cases of this series the hernia had shown itself while the child was suffering from a severe cough. Phimosis and preputial adhesions were present in 89 cases, and Dun is of opinion that by causing the child to cry and strain these conditions increase the abdominal pressure, and so tend to produce hernia. In two cases the exciting cause appeared to be the too tight application of a binder. The same conditions are at work in older children, where, in addition, may be found intestinal parasites, vesical calculus and strain. In 13 cases imperfect descent of the testicle was associated with the hernia. Two factors lead to the production of inguinal hernia in infants and children: (1) an imperfectly closed or actually open funicular process—the predisposing cause; and (2) some cause leading to increase of intra-abdominal tension—the exciting cause. In treatment the exciting cause demands our earliest attention, and here the bowels should be corrected, cough treated, and phimosis and preputial adhesions submitted to operation. If operation for hernia is intended then Dun performs any necessary circumcision ten days or a fortnight beforehand. Further treatment concerns the hernial sac, and this is carried out by truss or operation. Truss treatment cannot begin too early, and the author prefers a light steel truss covered with india rubber, but applied with a strip of well-powdered lint next the skin, and the truss is to be worn day and night. The pad of the truss should be flat. Dun thinks that the treatment of hernia in children by truss should be limited to cases occurring during the first year, where no undescended testicle complicates the condition and where the rupture is not very large. In all cases of hernia in children over one year of age he believes that operative treatment is infinitely the most satisfactory method. The risk from operation for radical cure of reducible inguinal hernia is no more than that which must always accompany the administration of a general anesthetic. The results of operation are entirely satisfactory, and the cure is really a radical one. Duration of treatment is three weeks, then the patient is allowed to be up and about, and no truss is worn. The author has the child prepared as follows: The child is bathed the night before operation, and the lower part of the abdomen is thoroughly washed with soap and water, next with ethereal soap, subsequently with $^1/_{500}$ solution of biniodide of mercury in methylated spirit, with a 10 per cent. addition of glycerine. After this the parts, with the exception of the penis, are covered with a wet dressing of saturated boracic acid solution, over which mackintosh tissue and bandage are placed. The child is tied down in bed, and a bottle placed between the legs to catch the urine in those cases where control of the bladder has not been gained. The following morning the boracic dressing is removed, the parts washed with biniodide solution, and a $^1/_{80}$ carbolic acid wet dressing applied for an hour or two before operation. The author operates aseptically. The incision does not encroach on the scrotum. The sac is isolated, and freed as high as a point above the level of the internal abdominal ring. A fine catgut ligature is applied, the lower part of the sac is cut off, and the stump retracts beyond the internal abdominal ring. The inguinal canal is closed by one or more sutures passed through the conjoined tendon and inner part of Poupart's ligament, behind the cord, after Bassini's method. The wound is closed without drainage, and a sterilized gauze dressing wrung out of $^1/_{60}$ carbolic applied, and over this sterilized wood wool, and a crossed perineal bandage. With good nursing it is quite unusual that the dressings have to be changed owing to soiling. The author concludes:—(1) Truss treatment is only to be recommended during the early months of life, and even then it is uncertain and tedious. (2) Operative treatment is the only certain method of cure after the first year; its risks are small, and the duration of treatment short. (3) There need be no hesitation in operating during infancy on account of the danger of suppuration following upon soiling of the dressings.

Results of One Thousand Five Hundred Operations for the Radical Cure of Hernia in Children, performed at the Hospital for Ruptured and Crippled. — Bull and Coley (Medical Record, March 18, 1905).

In this hospital between 1890 and 1904 there were 15,375 cases of inguinal and femoral hernia in children under the age of 14 years, and from December, 1891, to October, 1904, 1,500 operations were performed for the radical cure in children. With few exceptions all cases of hernia in children were treated by truss for one or two years, before advising operation. Operation is also advised for strangulation, for hernia with reducible hydrocele, for irreducible hernia, and for femoral hernia. The authors believe that under the age of four years a very considerable number of cases of inguinal hernia, and nearly all cases of umbilical hernia can be cured by truss treatment. In 709 cases of inguinal hernia in the male a congenital sac was found 284 times, an acquired sac 425 times. The mortality of operation is practically nil, and the authors have therefore advised operation in most cases of hernia in children past the age of four years. They think that two-thirds of infants under the age of two or three years are apparently cured by truss treatment. Contrary to general opinion, they believe that operation in children is more difficult than in adults. The authors employ the method of Bassini, but use kangaroo tendon in place of silk, and as a rule place an extra suture above the cord to prevent widening of the new internal ring. In femoral hernia they perform high ligation of the sac, with a purse-string suture of kangaroo tendon, bringing the floor of the canal is contact with the roof. In 34 cases the cecum or appendix, or both, were found in the sac, and there were two cases of sigmoid hernia, one of them strangulated. In 85 cases operation was complicated by an undescended or partially descended testis. Eighty-four cases of interstitial hernia occurred in the series, but no case of pro-peritoneal hernia. Two cases of tuberculosis of the hernial sac were observed, and there were two cases of epigastric hernia, ten cases of umbilical hernia, two of ventral hernia, two of congenital hernia of the umbilical cord, two cases following operation for acute appendicitis, and one lumbar hernia. Practically all cases of umbilical hernia in children under 12-14 years may be cured by mechanical means. Of the 1,500 operations for radical cure there were six relapses after 1,076 Bassini's operations, and five in which the cord was not transplanted. The authors are of opinion that the majority of the relapses after any operation for inguinal hernia occur during the first six months after operation, and about 90 per cent. of the entire number occur during the first year. Out of 1,424 operation cases only 47 suppurated, or 3.3 per cent. Five hundred and sixty-seven cases were operated upon before the use of rubber gloves, and these showed 4.4 per cent. of suppuration; 933 operations performed since the use of rubber gloves showed 2.1 per cent. suppuration. The authors are strongly in favor of absorbable sutures in the deeper parts. There were four deaths in the series of 1,500 operations, or a mortality of less than 0.3 per cent.

Extract of Dichondra as a Bactericide in Diphtheria.—ARAMIAN (Medical Record, 1905, p. 335).

According to Dr. Aramian extract of dichondra brevifolia destroys the bacilli of diphtheria, usually within two to five days, without the slightest irritation, for it is not a caustic, and has no toxic properties if swallowed. Its use is therefore recommended as a supplementary aid to anti-toxin, being especially valuable in preventing long-continued infection of the throat. It must be applied frequently, viz., at least four or six times during the twenty-four hours.

Prophylactic Injections of Diphtheria Anti-toxin.—WESENER (Münch. med. Wochenschr., 1905, p. 538).

Dr. Wesener calls attention to the neglect of the use of diphtheria anti-toxin as a prophylactic remedy, and recounts the conditions under which its administration for this purpose is indicated. They may be tabulated as follows:—(1) the supervention of diphtheria in one of the patients of a ward, more especially in a children's hospital, the other children can thus be protected; (2) in an infectious hospital, when it is necessary to place an undoubted diphtheria patient in a ward with a doubtful case, it is advisable to inject the latter with anti-toxin; (3) to protect young children in a family when one of their number has contracted the disease. This procedure is advisable whether the patient is removed to the hospital or not, and more especially in the poorer classes. Dr. Wesener gives tables showing the percentage of secondary infections which have occurred under his own observation in the last ten years, and the dates at which they arise, no fewer than one-third showing themselves on the first or second day after the isolation of the primary case. Though prophylactic injections might not arrest all these cases yet they would be effective in five years, seven being under twenty years. The symptoms showed a great variability in the individual cases. Headache, mental hebetude, unconsciousness and coma, or restlessness the great majority of the cases, and even when an attack of diphtheria supervened it would be of a milder description. The dose should be from 300-400 units. ,

Two Rare Occurrences in Scarlet Fever. — Bleibtreu (Münch. med. Wochenschr., 1905, p. 1767). A girl, 7 years old, suffered from an undoubted attack of scarlet fever of a mild type. At the end of six weeks' stay in hospital she had a relapse, in which again the signs of scarlet fever were quite characteristic and more severe than in the original attack. Another girl, 15 years old, nearly three months after the onset of pleurisy on the left side, contracted a mild attack of scarlet fever, and during convalescence the usual inspection of the skin showed the presence of atrophic striæ on the left knee and right buttock similar to the "striæ patellares" occasionally met with after typhoid fever. Dr. Bleibtreu discusses shortly the probable origin of these atrophic lines.

The Pathological Anatomy of Typhoid Meningitis.—MacCullum (Johns Hopkins Hospital Reports).

In an autopsy on Dr. Cole's case of purulent meningitis the writer found the meninges greatly thickened by the accumulation of cells, fluid, etc., the exudate extending in some places deep into the sulci, and even into the substance of the brain with the blood-vessels. Very little of the exudate was to be found on the surface of the meninges, the bulk of it being infiltrated among the tissue-elements and between the meninges and the brain. The predominant cell was of the large, irregular mononuclear phagocytic form whose protoplasm is frequently stretched out into the most fantastic contours. All transitions could be seen between these and small cells resembling in every respect the lymphocytes of the blood. The large cells were particularly numerous about the veins, but were also scattered through the tissues. They even reached a diameter three to five times that of a polymorphonuclear leucocyte, and were provided with a large vesicular nucleus and an extremely abundant ground-glass-like pink-staining protoplasm, which evidently often throws out pseudopodia. That they are extremely active phagocytes is evidenced by the presence of bacteria, red blood-cells and disintegrating mononuclear cells in their protoplasm. Ohlmache, in a case of typhoid meningitis, had previously found the endothelium of the arteries lifted up by masses of cells, sometimes to such an extent as to obliterate the lumen of the vessel. In this case also similar elevations were found, the cells being chiefly polymorphonuclear leucocytes and red blood-cells, a few only being mononuclear cells. It is suggested as very probable that these cells had emigrated from the vasa vasorum in the adventitia. or had even invaded from the tissue outside the artery. The condition is not peculiar to typhoid meningitis since it was found even more brilliantly shown in a case of meningitis due to the micrococcus lanceolatus, and Councilman has described it in cases of epidemic cerebro-spinal meningitis. The large mononuclear, phagocytic cells already described are also present in other forms of meningitis, so that beyond the possibility of their relative abundance in typhoid meningitis there is nothing in the anatomical picture to distinguish this from other forms, and the diagnosis of the condition must accordingly depend on the recognition of the typhoid bacillus as the etiological factor.

Typhoid Meningitis.—Cole (Johns Hopkins Hospital Reports, 1905, p. 379).

Cases showing symptoms of meningitis are divided into three groups: (1) Those in which no meningeal lesions were demonstrated, or in which no definite relationship between the bacteria and the symptoms was found, so-called meningisme of French writers. (2) Cases in which the relationship of the typhoid bacillus was demonstrated by its cultivation from the cerebro-spinal fluid during life or at autopsy, and in which the demonstrable lesions were not of a suppurative character, so-called serous meningitis of Quincke. (3) Cases of purulent meningitis. Strictly speaking, cases in Group I. should not be cited as examples of typhoid meningitis, but rather as cases of typhoid fever showing marked meningeal symptoms. The possibility of a serous exudate occurring in milder grades of inflammation is á priori to be expected by analogy with what occurs in other serous cavities of the body. In some non-typhoid cases it has been shown to occur, the microscopical changes in the meninges consisting principally of edema and round-celled infiltration about the blood-vessels which are frequently congested. The writer gives details of a number of cases from the literature and from his own observation, which show that such a serous meningitis may occur during typhoid fever, and may be due to the action of the typhoid bacillus. From a study of the thirteen cases at his disposal it was seen that the age of the patients ranged between five and thirty-

and delirium followed by coma were quite constant features. Rigidity, spasm and twitching of the muscles occurred in variable degree, though usually moderate, in most of the cases. Stiffness of the neck, retraction of the head and abdominal rigidity were not constant features, but were present in several of the cases. Other symptoms, as convulsions, vomiting, Kernig's sign, etc., were less frequent. Death occurred in all of the cases but one. Lumbar puncture was done in eight cases. In all the fluid was clear, and typhoid bacilli were cultivated from it, though in one case only could bacteria be demonstrated microscopically. He suggests that lumbar puncture may have a therapeutic effect, and may possibly prevent a serous meningitis from becoming purulent.

A number of cases of purulent meningitis occurring in typhoid fever and from which the typhoid bacillus has been obtained in pure culture have been recorded by various observers, and Dr. Cole gives a table of these, and reports in detail a very typical case which he has recently met with. In general, in cases of typhoid purulent meningitis it may be said that the features are those of a general acute meningitis, not differing essentially from the pneumococcus form, but running a more acute course than is usually seen in cerebrospinal fever. Usually the diagnosis of meningitis is fairly evident, and sometimes the cerebral and meningeal features so predominate that the diagnosis of typhoid fever is difficult. In most cases the Widal test, blood culture, or the demonstration of typhoid bacilli in the spinal fluid are needed to make the condition clear.

Care and Training of Delicate and Nervous Children.—Warner (London Hosp. Gaz., December, 1905).

Warner insists on the value of appropriate clothing and diet. The latter should be as full as the child can digest, containing much animal food. Fat foods aid the increase of weight. If the child is long in getting to sleep, or wakes early, food should be supplied at the bedside. Long, early, and regular hours of rest in a well-ventilated and darkened room are appropriate for poor sleepers and early wakers. For purely neurotic children, country life and boarding-school are sometimes most appropriate. In recommending early training for children as a physiological means of brain culture, he insists on the avoidance of fatigue. Fatigue is early shown by the fact that the face begins to lose its expression, and becomes somewhat pale. The tired child does not balance the head erect or the hand straight, and irregular movements may occur. It is, however, a great mistake to leave delicate children untrained and uneducated. Such neglect often leads to disastrous results in hysteria, chronic weakness, inability to bear headaches without nerve prostration, and other miseries. The hopeful signs of mental aptitude and capacity for education are: (1) Spontaneity in movement and action; (2) control through the senses, leading to imitation of the teacher and co-ordinated action; (3) receptivity and retentiveness of impressions produced on the brain (memory); (4) response in action, and later in the use of words, the meaning of which has been gained by experience, showing intelligent mental action under guidance.

Tuberculosis of the Bronchial Glands in Children.—THOMPSON (London Hosp. Gaz., December, 1905).

Thompson calls attention to the great importance of tuberculous disease of the bronchial glands. Of fifty cases of fatal general tuberculosis, 78 per cent. showed the oldest lesion to be in the bronchial glands, while in not a single case were the cervical glands the cause of the fatal result. The early diagnosis of this condition is accordingly a matter of the utmost importance. The child wastes, becomes easily tired and languid, and there is an evening rise of temperature. The enlarging glands may press upon the bloodvessels, the nerves, and the air-passages. In doing so they may cause a fixed pain behind the first bone of the sternum. From pressure on the veins we may have lividity of the skin of the head and neck, with venous enlargement over the front of the chest. Pressure on the nerves causes paroxysmal cough. If the trachea or large bronchi are pressed on, we get dyspneic attacks coming on. The physical signs are dulness behind the manubrium sterni, marked tracheal breathing over the sternum conducted to the surface by the enlarged glands, and a continuous venous hum produced by pressure on the large veins. An X-ray photograph is also of value in diagnosis. The prognosis is favorable if the condition is diagnosed early. As regards treatment, change of climate should be obtained at once whenever possible. The diet should be rich in fats and proteids. Cod-liver oil and iodide of iron may be tried. Iodide may be painted over the manubrium, and mercurial inunctions made into the axillæ at bedtime.

On the Clothing of Infants.—O'FOLLOWELL (Journal d'Hygiène, November 25, 1905).

Reviewing the history of the clothing of babies through all time, the author points out how for centuries the mistake has been in hampering movements of limbs, chest, and abdomen by various devices of swaddling-clothes. The effect on the development of the child is not the only evil of this method, for, as Dr. O'Followell points out, the actual process of clothing the child cannot do it any good, being turned about in all sorts of ways: first on its back, then on its face, then on its side, back on to its face, then on its back, etc., whilst the different articles of clothing are severally adjusted.

Further, pins, seams, and buttons frequently press on undesirable places, causing pain and discomfort to the baby.

Whilst visiting the English hospitals last year during the visit of the French doctors, he was introduced to the Alione method of clothing infants, and he strongly advocates its general adoption.

The method essentially consists in combining the various articles of clothing so that the baby is laid on the clothes on its back, remaining in this position throughout the process of clothing.

The clothes are fastened at the side by means of tapes—no pins or buttons being used.

In this method the baby can be completely clothed without having been turned over a single time, all fastenings are away from points of pressure, and the fact that no pins at all are used does away with any danger or possibility or irritation from that source.

The result is a perfectly secure, loose, and warm clothing for the infant without any of the drawbacks so common to the usual methods of clothing them.

Case of Severe Infantile Paralysis.—GUTHRIE (Polyclinic, January, 1906).

Guthrie describes a case which illustrates practically all the varieties of infantile paralysis affecting the lower limbs. The patient was a boy, aged four, who suddenly complained of headache, and vomited after being in the sun all the morning in late June. Next day the left lower limb, and on the second day the right, was found to be paralyzed. He lay like a log, and could not bear to be touched anywhere. Delirium was present at night. In three days the constitutional symptoms passed off, but he remained totally paraplegic until October 10. At that time both limbs seemed nearly equally powerless. When last examined, both feet and both legs, but especially the left, were cold and bluish-red. Muscular wasting was not extreme. The knee-jerks were absent. The anterior and lateral muscles of the left leg below the knee were paralyzed. Dorsi flexion and lateral flexion of the foot on the ankle were impossible. Slight power of plantar flexion of the toes remained. The foot had assumed the position of talipes equinus. On the right side the anterior muscles had escaped. Dorsi flexion was good, but the calf-muscles were wasted and paralyzed, giving rise to commencing talipes calcaneus. The hamstrings on the right side were also affected. On both sides the quadriceps was paralyzed. On the left side there was little power, if any, in the psoas, iliacus, and gluteal muscles.

The methods of treatment of such a case may be classified as follows:

1. Re-education of movements.
2. Massage and electrictiy.
3. Orthopedic apparatus.
4. Surgical procedures.

With regard to the second heading, mild faradism is painless, and is most efficacious in restoring function. It is best employed in conjunction with massage and passive movements. Powerful currents, it should be remembered, are harmful.

Diabetic Coma Treated Successfully by Means of Alkaline Solutions.—SEARS (Boston Medical and Surgical Journal, November 30, 1905). The case of a boy aged thirteen years is reported. The patient was suffering from diabetic coma. He was given 8 ounces of sterilized salt solution, containing bicarbonate of soda almost to the point of saturation. This was injected under the skin over the thorax. He was also given a solution of sod. bicarb. (a drachm to the pint) by the mouth. Large quantities of this were taken. The coma gradually lessened, but he remained drowsy for several days. The urine continued to be acid. The diet contained a little bread and large amounts of milk. Acetone was present in the urine. Eventually the boy recovered completely.

Gummatous Synovitis in a Child Simulating Rheumatoid Arthritis.—FINDLAY and RIDDELL (Glasgow Medical Journal, January, 1906). The authors give particulars of a child aged nine years with definite congenital syphilitic history. She had Hutchinsonian teeth, interstitial keratitis, bossing, and marked deafness. Both knee-joints were swollen, the left more so than the right. On the left side part of the thickening seemed to be bony, but part was synovial. Slight creaking was detected when the knees were flexed. Both elbow-joints also were considerably swollen, as were also the wrist joints, while movement of the latter was much restricted. The metacarpophalangeal joints of the thumb and index-finger of the right hand were distinctly thickened, while the swollen joint in the thumb conveys a vague feeling of fluctuation. There was some enlargement of the cervical glands, and the spleen slightly enlarged. She had been treated by means of syr. ferri iod. without much benefit. She was then put under treatment by means of the high-frequency current for half an hour three times a week. The swelling and pains became greatly alleviated. The case was at first thought to be one of rheumatoid arthritis, but skiagrams showed that there were no changes in the bones or cartilages. We have here, therefore, an example of unusually widespread symmetrical synovitis of syphilitic origin, accompanied by effusion. It is interesting to note the improvement resulting from the use of the high-frequency current, combined with the internal administration of mercury and the comparative inefficacy of potassium iodide.

Paralysis Occurring in Chorea. — Simon (Annales de Médicine et Chirurgie Infantiles) reports and discusses an interesting case. Rachel G., 12 years old, admitted to the hospital Trousseau on April 21. She was suffering from a severe attack of chorea. The muscles of arms, hands, legs, face, neck and trunk all were exceedingly active and incoördinate. Eating and drinking were very difficult; speech almost impossible. Temperature was 101°, and general nutrition good, however. There was no delirium. Physical examination of the internal organs was negative. On the 22nd and 23rd there was no special change. On the 24th she was manifestly worse; movements became so severe as almost to cause her to be thrown from the bed. Delirium appeared. She talked incessantly. Incontinence. Temperature remained about 101°. Heart and lungs negative. She was only quieted by morphine grain 1-12, following 75 grains of chloral hydrate. On the 25th, as the movements continued active she was given besides the chloral, 45 grains of antipyrine. On the 26th, temperature yet remained at 101°, but other symptoms were better. Delirium ceased, less movement, no involuntary movements or micturition. Moreover the temperature fell that evening to normal. No cardiac lesion. No change on the 27th. On the 28th a complete hemiplegia of the right side was found, with entire anesthesia and the Babinski sign. Slight choreic movements on the left side. Absolute incontinuence. Movements of lips and tongue preserved, but cannot speak a word. Child completely indifferent to everything about her. General condition good, temperature 100°; this continued to rise during the next two days and then reached its maximum, 102.6°. Heart continued negative. Antipyrine which had been continued to this date was omitted and no other treatment given. Gradually the choreic movements of the left side disappeared. Temperature became normal May 7. Incontinence ceased, mental condition improved, but the child remained dumb and paralyzed. The paralysis improved somewhat by October, but the aphasia was only very slightly relieved. The author looked up similar cases in literature and arrived at the conclusion that the condition is only to be explained as the result of a cerebral embolism caused by a latent choreic endocarditis disclosed by the appearance of the signs of a mitral stenosis.

PEDIATRICS

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ORIGINAL ARTICLES

THE EYES AND EARS OF SCHOOLCHILDREN[1]

By Frank Allport, M.D.,

of Chicago, Ill.

So much has been written on the subject expressed by the title of this address that a literature of its own has developed, and it is quite impossible to write more upon this theme without indulging in much repetition and recapitulation. I feel especially apologetic in this regard, as I have for ten or twelve years appeared almost constantly in print on this subject, and feel that I have but little to say, except to urge activity on the part of physicians, educators, and legislators, that the good work already begun may be promptly finished. Nevertheless, you have kindly invited me to address this body of health officers, and the honor so courteously extended has found in me a ready responsiveness, for I never can and I fear never will have strength to resist a call to talk upon my favorite theme. Therefore, my colleagues, I present myself before you prepared as of yore again to do battle for the eyes and ears of the coming generation, realizing fully that I have nothing new to offer, but believing that, like some good old books, and music, repetition can do no harm, and feeling that the last word will not be said upon this subject until every boy and girl in the civilized world shall have had the enormous benefit of annual physical examinations and proper medical supervision, which shall fit them as far as may be for the work of acquiring an education without physical disintegration.

The public schools are a public trust, through whose portals all parents should confidently and confidingly lead their offspring, feeling that when the care of these young lives is transferred to the supervision of the school authorities they are safe from harm, and will at least be handed back to them in as good condition as they were at first. That good and creditable work along these lines has been and is being accomplished is unquestionably true, and conditions are immeasurably better than they were ten years ago, but much work remains to be done, and until the annual and proper physical examination of *all* schoolchildren shall have been accomplished those having the interest of the coming generation at heart should press on, battling for the right, until victory is perched upon their banners.

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[1] Read Jan. 18, 1906, in Columbus, Ohio, before the Local and State Boards of Health of Ohio.

It should never be forgotten that it is said there are in the United States alone to-day almost 20,000,000 schoolchildren; that about 8,000,000 of such children suffer from some ear. nose, or throat disease which also impedes their school progress, and that a vast majority of such abnormal conditions can be either cured or materially alleviated by early medical interference, and will become chronic or incurable if neglected. Think of it! There are in this country about 16,000,000, or 80 per cent., of schoolchildren suffering from some eye. ear, nose, or throat disease which can be easily detected and generally cured, if the public health and educational authorities will only decree that this work shall be done! Is it hard to do? No. Is it expensive? No. Can it be easily and effectively accomplished? Yes. Then why is it not done?

My imagination is not always active. and for this defect I humbly beg my hearers' pardon, but to the best of my knowledge and belief the reason for the non-accomplishment of this plain duty on the part of hygienists, educators, and legislators is simply apathy, neglect or politics. Can such authorities not rise from the level of the past to the heights of the present and of the future, and offer this tardy reparation to the poor neglected children of this country, who must some day control its destinies? I believe that they can. and that they will, and that the next few years will disclose the full fruition of the devoted labors of the past.

It may also be of interest to know the financial aspect of the situation, as this phase of a problem will often exert a potent influence when all others fail. and the fact that the people of the United States have about $700,000,000 invested in public schools may add a dignity to the situation and stimulate a desire to have the visible representations of this immense amount of money managed in the best possible manner which is quite impossible unless the schoolchildren of this country are in good physical condition

It may also interest students of sociology to know that there are in the United States over 300.000 blind people, many of whom would not have become blind if their disabilities had been detected during school life, and that it costs the public in the neighborhood of $15,000.000 to care for these unfortunates. Reducing the question then to the mere sordid standard of money, is it a matter of public economy to neglect the eyes of schoolchildren?

We should remember also that over 50,000 American children are annually removed from schools on account of debilitated physical and nervous conditions brought on by physical incapacity and injudicious mental pressure. Such children, being unable to acquire a suitable education, fall by the wayside, grow up in invalidism and ignorance, and help to fill the ranks of the weaklings, the worthless, and the criminals.

It would seem almost unnecessary to produce an array of arguments with the object in view of convincing those having such matters in charge of the necessity for the annual and systematic examination of schoolchildren's eyes and ears, for it is an undisputed fact that healthy eyes and ears are quite essential to the ready acquirement of an education, and yet it is but natural to presume that where the proper authorities do not take decisive action along these important lines they cannot be fully awake to their duties and responsibilities. It seems then essential to remind them that almost all children are born with reasonably healthy eyes and ears, and that such conditions as myopia, hypermetropia, devastating inflammatory conditions, etc., are usually due not only to possible inheritance, but to malnutrition, excessive study under improper conditions, neglect, lack of judicious medical attention, etc., etc., most of which could and would be corrected if the situation was thoroughly understood and studied. I claim that such an understanding is quite impossible without annual systematic examinations. The sporadic care of this child and that child does not suffice; the general and kindly observation of children by even willing and intelligent teachers, with occasional advice to students and parents that medical advice be sought, is not enough, for generally no attention is paid to such unofficial suggestions, certainly not as much as would be paid to a formal printed notification of the child's imperfect physical condition; and besides this, many important and serious diseases may exist without exciting the observation of the average teacher.

The myopic eye is a diseased eye proceeding from small degrees of short-sightedness to those of enormous extent, accompanied by disastrous ocular congestions, detached retina, etc., all fostered by excessive study under improper conditions, such as bad and meagre illumination, insufficient out-door life, lack of proper glasses, etc. The average increase in myopia during school life is about 20 per cent. In Germany, the land of bad print and profound students, this proportion is increased to about 60 per cent. The hypermetropic eye renders study exceedingly irksome by producing headaches, tired eyes, nervous exhaustion, etc., thus sowing the seed of illiteracy, ignorance, and idleness, all of which might be prevented by timely detection and medical intervention, coupled with the correct adjustment of glasses. Inflammatory ocular conditions, such as the various forms of conjunctivitis, keratitis, etc., besides being foci of more or less dangerous contagion to other children, produce conditions making suitable study impossible and improper, and again provide scholars that are a burden to their teachers and encourage the swelling of the ranks of the idle and the outcast. Nasal and throat hypertrophies such as turbinated enlargements, and polypoid, adenoid, and tonsillar growths, produce deaf children, unable to absorb ordinary education, and discharging ears, which not only induce deafness and may be a menace to life, but necessitate the production of microörganisms, which should exclude such children from school, owing to their menace to the health of other scholars.

The pity of it is that practically all of such conditions, and many more too numerous to mention, could be cared for and cured if detected early in life, by the annual systematic examination of all schoolchildren's eyes and ears; and of the various methods that have essayed from time to time to accomplish this purpose, the simple examination by school teachers is the only one that has been even reasonably successful, and is surely the only one that contains sanguine prospects of becoming universally adopted. Such examinations would be made if only all health and educational authorities, aroused to the importance of the situation, would issue their separate orders that such examinations *must be made;* the pity of it is, they do not do it. A large proportion of the idle and criminal classes is being supplied and resupplied, as generation after generation of children are thrown upon the world, by children who for some reason or other have failed to acquire the education which enlarges and uplifts the soul and character, and opens up the avenues of useful employment. Visit the criminal courts, the reformatories, the gaols and prisons, and how often do you find lawbreakers who have been plucked from the ranks of the educated? Occasionally, it is true; but the rank and file of these offenders are men and women of meagre or no education. Some, it is true, are natural criminals, the offspring of criminal parents, but even here there must have been a beginning, proceeding some generations back, perhaps from some ancestor who was deprived of an education by some physical defect, possibly of the eye or ear. The great mass of criminals, however are not born offenders, but become so through associations and lack of a cultivating and ennobling education, which is, of course, impossible if physical defects place such an education beyond their reach. I have no desire to magnify my theme, and do not by any means believe that all crime could be expunged from society by the correction of physical defects of children, but I earnestly believe that there is enough real matter in this subject to claim the fixed attention of sociologists, health and educational authorities, and lawmakers, as a matter both of moral obligation and of public economy.

The physical condition of our children reaches down then to the very substructure and foundation of society. The boy of today becomes the man of to-morrow, to whom we, and the succeeding generations must look for the advancement and prosperity of our country. The child cannot act for himself, and often the parent is equally helpless, or careless. It behooves us, therefore, who have such matters in charge to act for him, and to act wisely and well. His physical and moral as well as his intellectual status and progress should be closely watched and guarded, and probably no avenue through which he can be reached is so important and accessible as the public school. Here he spends most of his waking hours, and it is here that his body, mind, and heart should be under the strictest surveillance. The school requests, nay enforces, his attendance, and volunteers to superintend the unfolding of his young life in its most critical period. It is, then, the obvious duty of school teachers and authorities to note well their important and self-assumed obligations, and to give the child the benefit of the best and most modern thought and judgment upon this sacred and important subject. Our schools undoubtedly provide opportunities for great intellectual advancement, and I believe that the general moral tone of our schools is of high quality, but what of the physical condition of the scholar?

I believe we must all view with pride the marvelous evolution of our public schools and our educational system, notwithstanding the fact that over ten per cent., of the children of this country can neither read nor write. But while viewing with satisfaction the marked advance, during the past twenty years, in means and methods of teaching, I contemplate with peculiar satisfaction the care for and development of the body that is now evident in all schools, and which must rightfully be largely attributed to the untiring work and writings of the medical profession. Witness the playgrounds with their gymnastic apparatus, the baseball, football, and golf teams; observe the sanitary buildings, well lighted and ventilated; notice the well built and adjustable desks, the well printed books, the good drinking-water and clean cups; see the careful seating of the scholars with reference to their vision and hearing, not forgetting the conscientious supervision of each scholar's physical condition by the average room teacher and the medical school inspector. Such observations must make us realize that progress has indeed been made, and that while much remains to be done, we have no reason to feel ashamed of the advances and accomplishments of the past, and have much occasion to believe that the future holds in its hands the full fruition of all our hopes.

Two things are necessary to raise corn—one is the seed, and another is a favoring soil and conditions. So it is with the enlightenment of the young. The means of education are necessary, viz., the buildings, properly placed, constructed, and conducted, including systems, books, etc., etc., and *then* the child with the receptive mind and healthy body and senses, capable of receiving instructions and profiting thereby. We are surrounded by the *means* of education, for modern schools with their effective machinery are a source of gratification and delight to all, but enthusiastic, progressive, and systematic educators do not always consider the *soil* upon which the seed of enlightenment falls; in other words, they are disposed to consider children as a massed entity, and do not separate them into isolated individuals with distinct inheritances and mental and physical peculiarities, rendering them more or less adaptable to the requirements of the modern public schools. Children are thrown into the great machinery of school life, are divided into grades, and are expected to adhere to them, and become educated according to a certain system. A child may have a weak or crooked back, which will become aggravated by close confinement at improperly constructed desks; he may have lungs handicapped with the incipient germs of tuberculosis, encouraged by the protracted inhalation of vitiated school air; he may languish from general systematic impoverishment, and pine and droop under too much study and too little fresh air. These are some of the conditions noticed in schoolchildren militating against the easy acquirement of an education, but more directly essential still are certain conditions of the organs of special sense of seeing and hearing, which are certainly of prime importance in the imbibition of presented instruction. If a child cannot see well and hear well, his position is certainly most unfortunate in the modern public school, where he is expected to keep up with his grade of work or else subject himself to chagrin and mortification.

Do not understand me as saying that our schools are likened to the Car of Juggernaut that ruthlessly throws down and crushes all who unfortunately come in contact with its destroying wheels. Far from it. I fully appreciate the gentle feelings that proceed from the hearts of most teachers towards those children committed to their care. I am not unaware of their watchfulness and solicitude over their little flocks, that prompts them to change the seats of the deaf and near-sighted, to make allowances for any noticeable physical or mental shortcomings, to visit parents and urge upon them the necessity of action concerning the health of a child; but these are isolated though frequent instances inspired by individual sympathy and character, and restricted by necessary ignorance of such subjects on the part of the teacher. What we want is a paternal systematic school system of health investigation, by which the physical defects of children will be made manifest, and steps taken to protect pupils against themselves, and in many instances against their parents. We also want a system that, after these unfortunate conditions have been discovered, will not *allow* but *insist upon* the harmonizing of the studies to the child, and not the child to the studies. I am not unaware of how often this is done; that a doctor's certificate of poor health is usually respected; that the course of study is sometimes changed under the advice of the parent or teacher; but I think I am not wrong in saying that these changes are comparatively infrequent and so little encouraged that children will often endure much physical discomfort, or even suffering, rather than assume the chagrin and mortification brought upon them by the unenviable distinction of a grade change. These changes should be inspired from the intelligent illumination of regular physical examinations, and should be so common as to excite no comment and give rise to no loss of a pupil's self-respect, or disappointment on the part of the parent, who frequently allows a child to languish and acquire permanent invalidism rather than interfere with his class standing or the date of a projected graduation. I would not be understood as advocating the abolition of systems and grades. It is needless to say that schools cannot be properly conducted upon other principles. Neither do I advocate the *indiscriminate* changing of grades, without just and adequate consideration. Neither do I ignore the fact that grades are frequently changed for good and sufficient reasons. I advocate more systems and more grades. I advocate a system of physical examination in schools by which we may *know* the condition of a child's health, and not trust to chance or circumstance to detect it, and I advocate more and shifting grades, commensurate with the physical condition of defective children. In other words, I do not believe in the wholesale education of the rising generation, which is our country's hope, its bulwark, and defense, and whose physical as well as its moral and mental condition is a sacred trust which we must guard and cherish. I do not believe in thrusting these little, yielding, impressionable, often sickly lives, into a common crucible to be molded and turned out with identical exactitude and precision. I believe that children should not be damaged by their educational existence, but should emerge from the portals of the American public school in better physical, mental, and moral condition than when they were entrusted to its fostering care, and that steps should be taken calculated to bring about the fulfilment of this plain and imperative duty.

While the physical examination of children should include *all* children, rich or poor, young or old, it is to the poor and neglected child that they must of necessity become the most useful. The children of the well-to-do and intelligent parents are usually, though not always, well cared for through parental love and solicitude, and their slightest ailments ministered unto by the medical adviser, but it is quite otherwise with the children of the tenements, the hovel, and the slums, who frequently are parentless, or, God knows, might be. If education is worth anything in the broadest sense, and if it passes beyond the borders of dilettanteism into the broad realms of those influences which stand for human uplift, then it should reach down, down to the very dregs and bottom of the social scale, and pull up the most unfortunate of the human race and place them on par with their fellow men. You and I both know that education will perform this great evolutionary process, and I claim that it is the inalienable, inborn right of every citizen of this great, magnificent Republic to be placed in a position where an education may be acquired, for to education we must look for the solution of many of the sociological and criminological problems of the day, the solving of which means much for the betterment and happiness of our Fatherland. If obstructions exist militating against this Utopian condition, which are relievable by acts undertaken by the guardians of the public welfare, they should not shrink nor hesitate in the execution of their duty, but should cheerfully and promptly perform such acts, and if necessary vicariously assume the office of father and mother to those who are bereft either by death or unfortunate condition of the benefits of such benignant influences.

The responsibilities of school authorities along these lines is enormous, and involves among other things, such questions as the location of school buildings with reference to air (Billings says that children should have 30 cubic feet of fresh air each minute for each child), space, noise, and drainage; the construction of the building itself with regard to window space, and the direction of light, proper ventilation, plumbing, and heating; the necessity for good and artificial illumination; the prevention of overcrowding; the necessity of medical inspection before and during school life; the proper drinking-water and cups; the providing of washstands, towels, etc., that will be free from contagion; the construction of desks of different sizes for different ages; the use of desks that are of the proper slant and height, and compel an upright position in reading and writing; the frequent intermission from studies, and the change from one study to another, thus compelling a combined rest of eyes, mind, and body; the proper regulation of the means of study, such as the distance and color of the blackboards, the color of slates, the character of print, and the paper on which it is printed; the necessity for vaccination; the exclusion of contagious diseases, and the exertion of advisable quarantine regulations; the placing of scholars in grades suitable for their physical and mental conditions; the forbidding of too many studies, in order to prevent much home study; the supervision of games, sports, etc., and the general physical health of scholars. These and many other problems must be met and solved by school authorities, and upon their wise and conservative opinions and acts depend very largely the ocular and aural health of children and the general well-being of the coming generation.

One of the most important topics for those who manage schools to consider is the proper care of children during the period of adolescence, or, in other words, between the ages of about 14 and 18. During the course of this wonderful unfolding of Nature's purposes the nervous, mental and physical condition of the child is in a peculiarly sensitive and precarious condition. Nature is busy with her physiological changes, the child's resistance is taxed to its utmost, and during this important epoch of existence the individual should surely be relieved of all unnecessary physical, nervous, and mental taxation. This is not the time for excessive study, either at school or at home; it is not the time for grade vaulting, or extreme mental activity; and yet how often do we see children, ambitious themselves, perhaps, or forced to unduly studious habits by ambitious parents or teachers, paling and fading away from over-application, until a broken-down constitution, thus early in life, proclaims the folly of the undue prosecution of a prevailing error.

One of the most interesting investigations that have been recently made concerning the relations existing between the ocular conditions and mental development has been undertaken by Gelpe, who has examined 578 physically defective children and found that 419, or about 72 per cent., had defective eyes, and that the worse the mental condition of the child, the worse the eyes were found. A very large majority of these cases were improved by treatment, glasses, etc., showing what can be done even with children of feeble intellect by intelligent examination and care. He shows that a predisposition to feeble-mindedness, congenital or otherwise, may certainly become active or be aggravated by various ocular defects, especially by uncorrected refractive errors. He compares defective visual organs to an ill-adjusted objective of a photographic camera, imparting to the retina and the brain indistinct images, thus putting such severe strain on the nervous system as to handicap the mental development of the child. He found the significant fact that myopia decreased in direct proportion with the decrease of intelligence, and found that in these children of defective mentality myopia existed in about 12 per cent., of the cases, hypermetropia in about 32 per cent., while astigmatism occurred in 30 per cent., of the cases. These data are most interesting, and, I believe, fully coincide with the opinion of those who have observed many children of low physical or mental development.

The title of my paper indicates that I am here to speak to you about the eyes and ears of schoolchildren, and while I have, perhaps, wandered far from my subject, I contend that it is but a narrow specialist who believes that these organs are separate kingdoms, to be separately considered; they are a part of the body corporate, and must be regarded as merely sections of the human frame, and largely dependent upon the other portions of the body for their intrinsic health and well-being. Consequently it is quite impossible intelligently to discuss the eyes and ears of schoolchildren without at least having something to say concerning the more comprehensive topic of the general well-being of the children themselves. I trust, therefore, that I will not be considered as specializing too much when I say that I believe it to be merely stating a truth when I affirm that aside from mental capacity there is nothing so essential to the acquirement of an education as good eyes and ears, for without them the pathway to an education must be thorny indeed. The examination of these organs of special sense by physicians is no novelty, and has been accomplished many times for the purpose of gathering statistics, and doing good. The employment of physicians for this work, however, has been well proven to be practically impossible, as it involves too great an annual expense, and almost invariably produces so much professional jealousy and friction as to place an efficient quietus upon any future investigations. For the purpose, therefore, of overcoming these two objections, and yet of accomplishing the end in view, I proposed in February, 1895, that such examinations should be annually and systematically performed by school-teachers, and that any scholars found to be defective should be furnished with what I call a "card of warning," which is to be handed to the parent. This card simply notifies the parent that his child is believed to have some eye or ear disease which impedes his progress in school. The parent is urged to consult his family physician, or some eye or ear surgeon, either at his office or free dispensary. The card does not *insist* upon such a consultation, and leaves it entirely open as to which physician shall be consulted. In this way no physician sees the child until the parent voluntarily escorts the patient to some medical man of his own choice; this, of course, does away entirely with any professional friction, or any suspicion of collusion or favoritism.

In order that the presence of disease may be detected by the teacher I have arranged a series of nine questions, absolutely plain and simple in their character, for which the teacher is to obtain the answers. They are, for instance, such questions as these: "Does the pupil habitually suffer from inflamed lids or eyes?" "Does the pupil fail to read a majority of the letters in the number XX line of Snellen's test types with either eye?" "Does matter or a foul odor proceed from either ear?" "Is the pupil a habitual mouth-breather?" It will be observed that these questions are so primitive in their character that any teacher worthy the name can easily furnish answers to them, and yet the nine questions are so comprehensive in their significance that when correctly answered they will disclose the existence of 90 per cent of serious eye, ear, nose, and throat diseases. The teacher, however, should not feel that she is expected to furnish a diagnosis of the child's disease, she is only expected to know that some abnormal condition exists. The diagnosis and treatment are left for the physician. These tests should be made as soon as possible after the opening of the fall term, as this is not only the most convenient time for the work, but it will also give the teachers a long opportunity of following up the tests and watching the effect of medical treatment. The tests should be made by the room teachers, as they are more familiar with their scholars' infirmities, and such a subdivision of labor imposes no hardship upon any one. A schoolroom can easily be examined in a day, which means, of course, that every public school child in any city can be examined in a day, provided each teacher does her own examining; or if it is preferred, a few pupils could be kept after school each day, and the entire work accomplished easily in one week. The extra work thus expended by the teachers will be generously rewarded in the end by the transforming of dull students to bright ones by medical treatment, glasses, deafness relieved, etc., for who does not know the nervous exhaustion experienced by teachers in endeavoring to instil knowledge into the minds of children who are suffering from eye or ear defects?

As a complete description of the tests will be given at the end of this address it will be unnecessary further to describe the method at this juncture, and I will merely say in answer to many inquiries that the expense of making these tests is so nominal that it is really not worth considering. For instance, a large city containing 5000 schoolrooms can have a testing chart with testing letters and instructions to teachers printed on it for every room by an expenditure of about $200. The expense for "warning cards" and simple record blanks need not exceed $100. A city like Chicago can, therefore, have this work thoroughly accomplshed by the expenditure of a little time, labor, and $300. The testing charts and teachers' instructions can be used for years if carefully preserved. It will, therefore, be seen that the question of expense is quite immaterial and need not be considered; the only question involved is an honest determination to see that this important work for the coming generation is annually and properly accomplished.

In order to facilitate the work and bring it more fully before the profession, I secured at the New Orleans meeting of the American Medical Association the passage of the following resolutions, both in the Ophthalmological Section and the House of Delegates:

Whereas, the value of perfect sight and hearing is not fully appreciated by educators, and neglect of the delicate organs of vision and hearing often leads to disease of these structures, therefore, be it

Resolved, that it is the sense of the American Medical Association that measures be taken by boards of health, boards of education, and school authorities, and, where possible, legislation be secured, looking to the examination of the eyes and ears of all schoolchildren, that disease in its incipiency may be discovered and corrected.

Since then these resolutions have been adopted by the Mississippi Valley Medical Association and by the State medical societies of the following States: Minnesota, Colorado, Illinois, Montana, New York, Indiana, North Dakota, Rhode Island, Alabama, Michigan, Utah, South Dakota, Delaware, California, Massachusetts, Arizona, West Virginia, Kentucky, Louisiana, Nebraska, and Washington.

The resolutions have also been adopted by the American Public Health Association, by the State and Provincial boards of health of North America, and by the State boards of health of the following States: Kansas, Minnesota, Colorado, Wisconsin, North Carolina, Vermont, Illinois, Montana, New York, Indiana, Connecticut, Ohio, North Dakota, Rhode Island, Alabama, Pennsylvania, Maine, New Hampshire, Michigan, and Utah.

The resolutions have also been adopted by the State boards of education in the following States: Texas, Kansas, Minnesota, Colorado, Wisconsin, North Carolina, Vermont, and Connecticut.

Besides this the tests are being placed in operation in the government schools in India, and in hundreds of schools in America where they are not required by school authorities.

It will thus be seen that the work is progressing, and I assume from the fact that I have been invited here to speak upon this subject that the State of Ohio, always foremost in excellent public service, intends vigorously to undertake this important step. Two State legislatures, Connecticut and Vermont, have incorporated this movement in a public law, and in the last message of the governor of Massachusetts to the legislature he strongly recommends that the annual systematic examination of public schoolchildren's eyes and ears be ordered by the lawmakers of that State. The Connecticut law reads as follows:

Section I. The State Board of Education shall prepare or cause to be prepared suitable test cards and blanks to be used in testing the eyesight of the pupils in public schools and shall furnish the same, with all necessary instruction for their use, free of expense to every school in the State.

Section 2. The superintendent, principal, or teacher in every school, some time during the fall term in each year, shall test the eyesight of all pupils under his charge, according to the instructions furnished as above provided, and shall notify in writing the parent or guardian of every pupil who shall be found to have any defect of vision or disease of the eyes, with a brief statement of such defect or disease, and shall make written report of all such cases to the State Board of Education.

The Vermont law reads as follows:

Section 1. The State Board of Health and the superintendent of education shall prepare or cause to be prepared suitable test cards, blanks, record books, and other needful appliances to be used in testing the sight and hearing of pupils in public schools, and necessary instructions for their use; and the Superintendent of Education shall furnish the same free of expense to every school in the State. The superintendent, principal, or teacher in every school during the month of September in each year shall test the sight and hearing of all pupils under his charge, and keep a record of such examinations according to the instructions furnished, and shall notify in writing the parent or guardian of every pupil who shall be found to have any defect of vision or hearing, or diseases of eyes or ears, with a brief statement of such defect or disease, and shall make a written report of all such examinations to the Superintendent of Education as he may require.

Section 2. The State Auditor is hereby directed to draw his order on the State Treasurer for such sums and at such times as the Superintendent of Education, with the approval of the State Board of Health, may require to carry out the provisions of this act. The total expense under this act shall not exceed Six Hundred ($600.00) Dollars in any biennial term ending June 30.

Section 3. This act shall take effect July 1, 1905.

The Vermont Law seems to be the better of the two, not only because it specifically states that the examinations shall be made in September, but particularly because it includes ear defects (which, of course, means also nose and throat defects), which is of the greatest importance. It is to be hoped that the Connecticut law will be amended to fiulfil this requirement. It is also to be hoped that these tests will become a law, and an active, living law, in every State of this country, but to effect this the combined medical energy of the profession in each State is a positive necessity. The American Medical Association resolutions should be passed by every State medical society, and active committees appointed to induce the State boards of health and education to adopt them likewise and actively to undertake the work. If this can be done an act of legislature is hardly necessary; still if this can be accomplished it is certainly a vast improvement, and should always be effected where possible. It should be remembered, however, that legislatures are hard to move, and only convene once in two years, while boards of education and health are more susceptible to measures of this kind and can be reached at almost any time. I would, therefore, advise that those interested in the matter should first secure the co-operation of their State medical societies and boards of health and education, and then secure suitable legislation on the subject wherever it is possible.

Let me then ask you, and through you all boards of health and education, all legislatures, and all who are interested in the physical and moral welfare of our children, do you believe that bad vision and hearing constitute an important barrier to the reasonable and easy acquirement of an education?

Do you believe that a vast number of children are thus embarrassed?

Do you believe that a great benefit to the children, to society at large and mankind in general, would be effected if such physical defects could be detected and relieved?

Do you believe that some such plan as I have proposed would be instrumental in largely relieving such defects?

Do you believe such a plan to be practical, unobjectionable, and inexpensive?

I think you must all answer "Yes" to each one of these questions. Then may I ask you still another question: Why do you not take up this work and carry it through? I address this interrogation to those who by reason of their public offices have the power to enact rules and laws calculated to produce beneficent results on the public at large. I, as a private individual, can do nothing, but you as board of health officers can do much. Will you do it?

THE TRAINING OF NERVE CENTERS IN CHILDREN.[1]

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In presenting to the society my views on the subject which forms the title of this paper, I make no claim to originality. I am simply rehabilitating an old friend in new vestments and attempting to express in words certain thoughts and ideas which in some form or other must have occurred to all of us. Practical psychiatry has recently taught us many a useful lesson concerning the development and training of the defective mind; what I am going to say this evening is concerned with the application of the same fundamental principles to the training and education of those lower nerve centers which control the humbler organic functions and which, not only in mentally defective children, but also in children of superior intelligence, often suffer from certain initial disabilities.

Though all of us are perfectly well aware that every organic event that takes places in our bodies is the expression of a reaction to outside agencies or the response to stimulation by the environment, in the practical domain of medicine and in the treatment of symptoms we seldom pause to consider that all these reflex actions represent chemical and physical changes set up in the central nervous system by forces reaching it from outside and that the objective manifestations of these changes are only secondary events occurring in the muscles and in other organs. In other words, we rivet our attention on the instrument which displays the function and not on the hand that guides the machine. How many of us, for instance, when we have to treat a case of dyspepsia think of possible disturbances in the nervous centers which control the functions of digestion? Do we not rather think of the pathological condition of the gastric mucous membrane or of disabilities of the motor functions of the stomach? The irrational and unscientific classification of diseases into functional and organic varieties has doubtless predisposed to this narrow conception of morbid processes. Every disease must primarily be functional in character. Whether organs do their business well or badly depends almost entirely on the central administration of the nerve cell; for the special activities of organs, as well as their nutritional and vegetative functions are inseparably bound up with impulses which emancipate from this central authority.

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[1] Lancet.

In the same way that in the treatment of disease our natural inclination is to consider the organ rather than the nerve cell that directs its activities, so in the physical education or training of the ordinary bodily functions we incline to direct our energies to the instruction and improvement of the organ with which we are concerned and momentarily forget that the only portion of the entire reflex arc which has a memory or is capable of instruction is the nerve cell which receives the stimulus we apply and which transmits orderly or incoherent messages according to the manner of its own organization.

To take a very simple instance in illustration of my meaning, I may remind you that it was not so very long ago that in the physical training of athletes for trials of strength and endurance it was the nutritional conditon of the muscles themselves that absorbed all attention; indeed, the physiological essence of fatigue was regarded as residing in the muscular elements and to be due to the toxic influence of fatigue products acting locally. We know now that the efficiency of muscle for the performance of work is dependent mainly on the condition of the cells by which they are represented in the central nervous system and that muscular fatigue is chiefly concerned with the exhaustion of the essential substance of the nerve cell. Although every specific muscular act is dependent on the integrity of the entire neuromuscular arc the nerve element must be regarded as the dominant and all-important partner, the only one, so to speak, which has a memory and which is capable of benefitting by past experiences and consequently the only one which it will repay us to educate or train.

What is true of the muscles is true of all other organs, and a point that I particularly wish to emphasize in this paper is that although most of our organic functions are automatically conducted—that is to say, without conscious participation in them on the part of the higher intellectual centers—nevertheless, each and every nerve center, no matter how humble its function, has a sort of unconscious memory of its own, which enables it to repeat again the part it has already played, and it is in the development of this unconscious memory that our efforts in the physical training of children can bear most useful fruit.

When we come to examine the phylogenetic history or evolutionary development of the so-called nerve centers which control the organic functions of the body, we find that some of them are extremely ancient and represented in animals which take a position in the scale of evolution far down near the roots of our genealogical tree. For instance, the cardiac center may be mentioned as a case in point. The nervous elements of which this center is composed have been endowed with their specific function from a very early stage in our evolution. From simple rhythmical contraction in an uncomplicated vascular tube has evolved the elaborate cardiac mechanism of the mammalian heart. From almost undifferentiated rhythmically contracting protoplasm there has come about a further and further separation of the neural and muscular elements until in the advanced stage of evolution presented in our own cardiac mechanism the neural elements are segregated in a defined area called the cardiac center and the muscular elements after very specialized differentiation have become arranged into one of the most efficient mechanical machines for the propulsion of fluid that it is possible to conceive.

This nerve center born in habits of rhythm in the days when it was structurally indistinguishable from its muscular connection has continued in the habit of rhythmical periodicity ever since; rhythm has been stamped on it, ingrained in it, and ground into its very soul, so that long before the human fetus is born the heart is beating with its normal periodicity. The respiratory center, though also an extremely ancient centre, is as compared with that of the heart a mere bantling; its education was initiated when our amphibious ancestors took to terrestial habits and has continued ever since in automatic and rhythmical activity: its education has been so prolonged and persistent that although before birth it is inactive in the human embryo, nevertheless, immediately afterwards it assumes its normal functions without any further re-education. I have taken these two centers as examples of automatic adminstration, because so stereotyped have become their functions that there is practically nothing to teach them. Indeed, generally speaking, it may be said of nerve centers that the more ancient their phylogenetic history the more permanent is the form of their activity, the earlier is the date of their appearance in the developing embyro, the less conscious are we of their existence, the less readily are they upset by extraneous circumstances, and the later are they to cease working at the final organic dissolution of our bodies.

I do not mean to imply that these ancient centers cannot be educated to higher degrees of functional efficiency by appropriate means but I do mean that so sterotyped are they in their habits that, unlike other centers to which I shall presently refer, they are not likely to go wrong under the ordinary conditions of life; neither do they require any artificial instruction. There are, however, other centers of less antiquity, which, although very apt and ready pupils, have to be trained by individual experience to the efficient performance of their duties. The nerve cells which compose these centers very lightly take the path of least resistance, and under similar conditions and in the face of similar stimuli they behave in the same way that their ancestral representatives have behaved before them, but even in the case of such comparatively ancient centers as those which subserve the function of temperature regulation a very considerable degree of education is necessary, and the manner in which these will subsequently perform their duties depends very largely on the nature of this educational experience.

Before I proceed to discuss the practical details involved in the training of centers which are not initially quite automatic in their functions, I may perhaps be permitted to make a few remarks on the varying degrees of receptiveness shown by such centers in different individuals to one and the same kind of educational discipline. It appears to be a property peculiar to all nerve cells to acquire with facility habits of rhythmical activity. The permanence and constancy of the cardiac, respiratory, and menstrual functions are instances of physiological periodicity of this kind. Similarly we are familiar with the fact that under pathological conditions nerve centers tend to assume a like periodicity in the storms or disturbances to which they are subject. Thus attacks of epilepsy, migraine, asthma, and other spasmodic neuroses very frequently recur at similar intervals of time. Tics and habit spasms are instances of nerve centres acquiring the same kind of rhythmical phases that are familiar in the case of the cardiac and respiratory centers. The thermotaxic or heat-regulating center very readily falls into similar habits of variation, as is instanced by the parallelism in the undulations of the diurnal temperature chart and in the peculiar character impressed on the fever temperature of persons who have once been the subject of malarial disease.

Children frequently afford instances of rhythmical movements in various muscle groups and among these may be mentioned the habit of rhythmical sucking. This habit which in the first instance is due to bad management and the constant application of the comforter or nipple to the mouth soon becomes automatic and rhythmical and quite independent of the stimulus which originally set the movement in operation. It is a habit which is closely associated with that of tongue sucking, chewing, and possibly with that of smoking and sweet eating. The ease with which good as well as bad habits can be impressed on the plastic material of developing nerve cells should be borne in mind in connection with the promotion of regular habits of sleep, relief of the bowels, and the digestion of food. The neglect or the want of orderly management in the early education of infants and young children in respect of these particulars is one of the important causes of irregularity in sleeping, digestion, and defecation, bad habits which in latter life so seriously interfere with our bodily comfort.

Speaking on the subject of the acquisition of habits, I would suggest that super-alimentation and gluttony represent to a large extent the perpetuation of habits acquired during infancy and early childhood. They imply over-development of the nerve centers which preside over the functions of digestion. The centers concerned are often trained and educated in habits of continuous, rather than of periodic, activity. The sense of hunger which prompts the intake of food is a psychological complex which is compounded of reflex impressions originating in the stomach and of independent psychological events which manifest themselves more or less automatically in the sensorium and which are partly due to various impressions reaching it through the nerves of special sense and partly to the hypertonic condition of the centers themselves. Under conditions of over-development of these centers there may be an imperative call for a constant intake of food. This pseudo-hunger, this cry of the gastric centers for some outlet for their too exuberant energies—some objective on which to vent their organic passion—is a very different thing from true physiological hunger which represents the summated demand of the tissues generally for food to satisfy their nutritional requirements. These centers should be trained and educated during early infancy and later childhood in periodic habits of functional activity, alternating with periodic habits of functional rest. In this way not only will they perform the work that is required of them in a more efficient manner, but the whole series of diseases which depend on the excessive intake of food will be deleted from the list to which civilized man is erroneously supposed to be born the heir.

Some children are very much easier to train or to educate in the normal performance of the organic functions than others. Thoroughly degenerate infants lose, or rather, we should say, never acquire, proper control over such ancient, automatic, and stereotyped actions as those exercised by the cardiac and respiratory centers; others of a lesser degree of degeneracy fail to acquire complete and co-ordinate control over such easily managed functions as those of sucking, deglutition, etc. Personally I always take a most unfavorable view not only of those infants who require artificial stimuli to induce natural respiration at the time of birth, but also of those who fail in co-ordination of such primitive muscular acts as those involved in sucking, swallowing, and in the motor functions of the stomach and bowel. How very easily these indications of incompetent nervous control can be overlooked in early infancy is illustrated by the fact that I have twice seen infants operated on for tongue-tie who were really examples of inherited nervous degeneracy and who were unable to perform the simple co-ordinated function of tongue extrusion.

Precocious children, especially those born of intellectual parents, acquire early control over the higher cerebral centers which depend for their activity on the co-ordination of impulses reaching them through the nerves of special sense. As a rule, too, in such children the lower centers which administer to the organic functions are exceedingly receptive to educational stimuli; but too often they develop at a rate which is incompatible with permanency and stability and soon show signs of premature decay. The nervous instability of these precocious children who have anticipated the natural progress of evolution and lived before their time cannot always be easily distinguished from that other form of nervous disability which is truly degenerative and indicative of a reversion to a more primitive type. Indeed, it is very difficult to say what is degeneration and what is evolution.

That higher sensitiveness of the nervous system to external stimuli, which in so-called neurotic individuals is very often the basis of their genius and intellectual superiority, carries with it at the same time certain disadvantages when viewed from the standpoint of the lower centers. For these centers, owing to their inherent excitability and sensitiveness, are not only liable to explode with dynamic energy in the face of subminimal stimulation, but they also tend to discharge neighboring and associated centers by permitting an overflow of their excessive energy. Thus in neurotic infants, provided with hair-trigger centers of this kind, the insignificant stimulus of an erupting incisor tooth may provoke not only local manifestation, but even a general overflow of inco-ordinated and explosive discharges which take the form of convulsions. Involuntary nocturnal enuresis and involuntary masturbation in infants are examples of the hair-trigger-like action of the lumbar centres. Spasmodic asthma and, indeed, I would venture to suggest bronchitis, are similar explosive neuroses of the respiratory centers, and spasms of the pylorus and larynx affords other instances of a like instability in other cell-groups in the central nervous system.

The sound education of these lower centers in neurotic subjects is a matter of great difficulty; two main principles, however, must be borne in mind. Firstly, that all these centers are hypersensitive to external impressions, and that they respond to stimuli which in normal and stable children would be subminimal and incapable of eliciting a discharge, and secondly, that the memory of these centers is highly developed, so that they very easily contract habits, both good and bad. Neurotic children should therefore be protected from every possible form of strong stimulus, whether this stimulus take the form of food, of extreme degrees of cold or heat, of light, of sound, of pain, or of pleasure—otherwise their centers will explode with violent and ill-co-ordinated energy, and the vicious habit will be perpetuated to the detriment of the harmonious co-operation of the organic processes of the body.

I have referred to the pathological overflow of ill-co-ordinated and stormy nervous disturbances which pass from one center to another as the result of supermaximal stimulation, and by way of illustration I would mention the violent jump which a nervous child may make when he hears a loud and sudden noise. I may add that exhaustion of contiguous centers is an analogous consequence of longer and more sustained stimulation. Instances of this kind are familiar in the exhaustion of the centers governing the acts of defecation and micturition, which follows as the result of prolonged labor in women; the spinal centers which control these muscular co-ordinations are in their anatomical relationship closely associated—and exhaustion in any one of them is followed by exhaustion in the others. Again, the whole arm, or indeed the whole body, may become tremulous and incapacitated for finely co-ordinated actions if the center for so small a muscle as the extensor indicis become fatigued by intermittent contraction. There is, however, a physiological corollary which follows from this reciprocal interaction between centers and it is that the energy stored up in one center can be drawn upon by adjacent centers when the latter become exhausted. This reciprocal support is well shown in the case of the higher cerebral centers, indeed, as Dr. L. H. Gulick[2] says, "the motor brain seems to be a sort of battery furnishing power for intellectual labor." Physical endurance as well as intellectual endurance depends, not only on the degree of development of the special center concerned, but also upon the storage capacity of the whole battery of centers. The fact that the motor brain can act as a sort of storage battery for the display of intellectual labor and that there can be an exchange of energy between more or less closely associated centers emphasizes, in a physiological sense, the importance of an adequate development not only of special motor centers, but of every available nerve-cell that can take part in any possible muscular coördination.

It has been said, and I believe truly said, that both in animals and in man "the scale of intelligence corresponds to the number of possible muscular coördinations, the more complicated the neuro-muscular apparatus the higher the intelligence." Indeed, whether we think, feel, or will, we repeat, as it were, in subjective pantomime the neural and muscular process whereby we obtained our original information. In view therefore of its influence on the development of the intelligence apart from every other consideration the training of the muscles and the various muscular coördinations from earliest infancy onwards is a matter of the utmost importance. Infants and children should not only be encouraged to develop their motor centers by the voluntary exercise of their muscles, but they should be systematically taught movements and combinations of movements for which they show no special inclination. Clumsy and ill-coördinated movements are indicative of similar methods of thought and there is no physiological stigma of degeneracy that more accurately reflects a debased quality of the central nervous system than want of adjustment in the finer muscular coördinations. Although no amount of training or education will convert a nervous system that is intrinsically inferior into one that is even relatively good, nevertheless a great deal can be done by educational discipline to compensate for initial inferiority and to raise it to a higher standard of functional efficiency.

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[2] Cohen's System of Physiologic Therapeutics, vol. vii., p. 241; Ibid., p. 242.

Without entering into details and special methods of muscular training for infants and children, I would refer to a general principle which applies not only in this case but in the training of all centers throughout the cerebro-spinal system, and this principle is that each center should be developed in its natural order—and by natural order I mean the sequence in our ancestral history in which each has been acquired. Certain muscular coördinations are, in this phylogenetic sense, comparatively old, as, for instance, the coarse movements of the limbs and trunk, so also are the grasping movements of the hands. These latter are well developed at the time of birth, but the independent and finer coördinations of the fingers, in conformity with their more recent acquisition, show no spontaneous tendency to development until the child is considerably older. "Nothing but disaster," says Dr. Gulick, "can be expected if we attempt to force motor education out of its natural order." The education of any part is best done when that part is ripening and the physiological moment is determined in accordance with the antiquity of its acquisition. Anticipation or procrastination are equally fatal. "When," says the same author, "special attention is given to specific exercises demanding skill in distal groups of muscles, before the more proximal have been trained, we often find neuroses supervening." Instances of this kind are demonstrated by infant prodigies who have been prematurely trained in special lines of muscular efficiency—as, for instance, in playing the violin or piano. It is therefore thoroughly irrational to teach children many of the favorite kindergarten occupations, such, for instance, as the threading of beads, or to allow them to learn to write in a small cramped hand before they have learned to control the larger groups of muscles which are used in ordinary gymnastics and in large, bold, free-hand drawing. As infants they should be encouraged to flex and extend the arms and legs whereas later they may be taught the finer manipulations. The interest of girls in sewing and of boys in shooting, throwing, and other games in which skill is called into play, which usually begins to evince itself when the child is some six years old, suggests the psychological moment at which the centers which control the actions involved should be submitted to educational discipline.

Although I myself might find it interesting to explain in detail how such centers as those which control the functions of digestion, excretion, secretion, respiration, vaso-motion, and the like can be trained in habits of orderly and coördinated action, I am afraid if I did so I should greatly exceed the limits assigned me. I shall therefore conclude what I have to say on the subject of the training of nerve centers in children by giving a single illustration in the instance of the heat-regulating centers of the sort of educational discipline which I believe to be generally applicable to the training of other centers which preside over the organic functions.

This thermotaxic center cannot, of course, be regarded as an anatomical entity; it must be structurally as it is functionally extremely complicated. It must be widely disseminated through the spinal cord and medulla and intimately associated with centers situated in the base of the brain and in the cerebral convolutions. It must be also intimately associated with the vaso-motor centers and consist of at least two distinct parts, each with separate and antagonistic functions; but for the sake of argument it may be spoken of as a distinct center in the same way that other groups of cells which subserve other functions are spoken of as nerve centers, although probably they are incapable of anatomical definition. The nerve cells, then, which subserve the function of heat regulation in the human body and which in the aggregate represent the so-called thermotaxic center, have only recently in our ancestral history acquired the distinctive function of maintaining a constant temperature in the body. Indeed, we need descend no further in the vertebral scale than to the amphibia to find examples of cold-blooded animals in which the heat-regulating centers are in an extremely primitive condition or practically absent altogether. In such poikilothermic or cold-blooded animals, although the temperature of the body is generally slightly above that of the surroundings, there appears to be no regular nervous mechanism for dissipating heat, although there are rudimentary mechanisms for increasing combustion when the external temperature rises. At any rate we may say that in all animals lower down in the animal scale than mammals and birds there are no proper centers for heat regulation. And therefore we are justified in saying that the ancestral history of our own heat-regulating centers is, as compared to that of other centers which subserve organic functions, of recent origin. Owing to the fact that these thermotaxic centers have only been recently acquired it is not surprising that at the time of birth they are in a comparatively undeveloped condition, that they are at all times easily disorganized, and that they require a considerable amount of experience or training before they work in an orderly and efficient manner. At the time of birth the functions of these centers are so ill-developed that if the infant is exposed to high or low degrees of temperature he is liable to perish; even under the normal conditions to which an infant is exposed immediately after birth there are a very serious fall of temperature and some risk. It is further of very great importance that the newly born infant should at all times be protected from sudden variations in temperature, otherwise the shock may so completely disorganize the still rudimentary centers that normal heat regulation of the body temperature is unsatisfactorily carried out in the future, and if this be so the child is naturally liable to take a chill owing to the lowered powers of resistance involved in such reduction of temperature. For the complete establishment of the normal functions of the heat-regulating center exercise, experience, and training are required. During intra-uterine life the fetus is immersed in a water bath of constant temperature and therefore experiences none of those variations in thermal stimulation which are necessary for the proper education of this center; at birth its education commences, but owing to the extreme delicacy of its organization, this education must be slow and deliberate. It is true that infants of great vitality can survive exposure to considerable degrees of cold even immediately after birth, but it is very seldom that the blood temperature is not greatly reduced by such exposure, and even if the infant survive it is more than probable, as I have said, that his heat-regulating mechanism will have been greatly strained in the process. Different infants show varying degrees of amenability to educational discipline no matter what the particular nerve center which is subjected to the régime. For instance, if an infant be kept at a constant temperature his educational progress as far as heat regulation is concerned, will be greatly delayed and fail to benefit by experience during the most impressionable and plastic period of his existence. The lessons of youth are always the best learned, but the youth of the thermotaxic center is evanescent and by the time that a child is a year or so old this center is almost grown up. And when this is the case he learns far more slowly. I do not propose to refer in detail to the exact manner in which the education of this center should be carried out. Broadly speaking, it consists in the careful exposure of the infant to air and water at successively lower and lower temperatures and with greater and greater ranges of variation. The temperature of the bath should, after the first few weeks of life, be gradually reduced, say a degree at a time, from blood temperature down to 70° F. The temperature of the sleeping room should be gradually reduced from 70° to 50°, or even considerably lower, and the number and the thickness of the clothing should be reduced in a similar systematic and carefully graduated manner. In this way the centres are trained to accommodate themselves not only to considerable changes of temperature, but even to withstand the shock of sudden and intense changes. I take it that the pathology of a chill and of the vagaries of temperature which follow is essentially a dislocation of the thermotaxic center by supermaximal stimulation. But whether the stimulus is in any particular case supermaximal or not depends as much on the efficiency of the center itself as on the intensity of the stimulus applied—that is to say, whether cold produces a shock or not depends on the resistance of the center and not only on the absolute intensity of the stimulus. The effects of cold, and indeed of heat, on the imperfectly developed centers of prematurely born infants are most striking. Not only is there a serious variation in blood temperature, but the disturbance originally engendered in the thermotaxic centers by such exposure may pass over to other nerve cells and produce generalized nerve storms which take the form of convulsions or epileptic seizures. I have, indeed, seen somewhat similar indications of shock in far older children who have been suddenly immersed in colder water than that to which they are used, but in these cases there was always a clear history of ill-development of the heat-regulating centers. And even grown-up people sometimes suffer from attacks of migraine from the taking of cold baths to which they are not accustomed.

This, then, is the sort of scheme of education that should be applied for the training of the heat-regulating centers in children; *mutatis mutandis* the same kind of régime is applicable for the training of other centers. In all cases the importance of avoiding supermaximal stimulation should be kept prominently in view. Think of the liberties that are often taken with these delicate organizations at the very threshold of their developmental history! Think of the indigestible masses of casein which are allowed to form in the virgin stomach of the newly born infant and think of the supermaximal effect such stimulation must produce on the immature centers which control the processes of digestion! Think again, of the supermaximal stimulation of a glycerine suppository in the rectum of a newly born infant! What an early education for a center which has still to learn its business! What wonder that so many children and adults suffer from constipation when in many of our text-books we are told that there is no safer method of relieving obstinate bowels than by enemata or glycerine suppositories. Safe, yes; but if you tamper with the delicate nervous mechanism of defecation in this way and educate the centers in a tolerance of supermaximal stimulation, how can you expect them to respond to the mild and natural excitation which is to be their physiological and normal experience?

The training of the humble nerve centers which preside over the organic functions may not claim the same attention that is necessary for the education of the higher cerebral centers, but I maintain that it deserves far more consideration than it usually receives and that the two are very closely bound up together. At the cost of again repeating myself I would remind you that any sound method of educational discipline of the lower nerve centers in children must take cognizance of the three fundamental principles to which I have already referred—namely, the avoidance of supermaximal stimulation, the prevention of the acquisition of explosive neuroses through the habit of over-action, and the education of each center in its natural order of development.

SOME RESPIRATORY DISEASES OF CHILDREN AND THEIR DIAGNOSIS.[1]

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I have endeavored in the following short lecture to pass in review some points in the diagnosis of diseases of the lungs in children, and I have illustrated some cases of difficulty by examples. I have also taken the opportunity to relate a danger which may attend exploratory puncture of the chest. Such untoward occurrences are extremely rare and, therefore, should in no way deter us in suitable cases from performing this simple operation; still, it is as well that we should be reminded that they do occasionally happen.

We may first pass in review the chief characteristics of the chest in infancy and childhood as compared with the adult chest. The shape of the thorax is somewhat cylindrical, the diaphragm is relatively high and the breathing is chiefly diaphragmatic; on inspection we must note also any signs of rickets, any want of symmetry in shape, any lessened movements or local recession of the soft parts or the bony walls. The position of the heart's impulse also should be noted, for it is often stated that this gives more information than any other single physical sign; and we must remember that this impulse is higher up and further to the left than in the adult, being often as far as a third of an inch to the left of the nipple line up to the fourth year, and up to the ninth year it is in or near the mammary line. Up to the seventh year the impulse is often found in the fourth space, and occasionally it remains as high as this in healthy children till the twelfth or thirteenth year. The rhythm of respiration is frequently irregular in infants except during sleep, and so has no diagnostic value at this period of life. Vocal fremitus of the cry is readily obtained and should always be practiced. Percussion should be especially light, otherwise a cracked-pot sound is readily produced, and this examination should not be made as far as possible during a crying fit, as then the note is apt to be dull over even normal lung, and slight differences are not readily perceived.

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[1] Brit. Jour. Chn's Dis.

It must be remembered that in infants the thymus may produce dullness over the upper part of the sternum and even as low as the third rib cartilage. Owing to the high position of the diaphragm the right lobe of the liver causes dulness to be higher at the right posterior base than is the case in the adult, and from a similar cause the tympanitic stomach note may appear to be unduly high in the left axillary region.

The spleen, if slightly enlarged, as is so commonly the case in children, may give a dulness in the left axillary region which is easily mistaken for a small collection of fluids, but the descent of the upper limits of this dulness during inspiration will distinguish the spleen from causes of dulness situated above the diaphragm, which do not vary in position during different phases of breathing.

Auscultation should be practiced while the child is quiet, as it is exceedingly difficult in a crying child, and for this reason it is the usual practice to reverse the usual order followed in the adult and to auscultate before percussing the chest; for the same reason it is well to auscultate the back before proceeding with the front and axillary regions.

The character of the respiratory murmur in an infant is too well known to require description; the chief point in auscultation is to be thorough, and to induce deep breathing by changing the position of the child now and then, or even to induce a cry when deep inspiration cannot be obtained by other means. Above all, do not omit to examine all parts of the chest. Pneumonia is often overlooked through want of auscultation of the upper part of the axilla, or through the mother objecting to completely bare the chest the supra-scapular regions are not examined.

Large pleural effusions in children are as a rule easily diagnosed by ordinary methods of examination, but localized collections of fluid, even when they are superficial, may present considerable difficulties, while if they are interlobar or diaphragmatic they may be easily overlooked or the abnormal signs put down to some other cause. A markedly dull or flat percussion note is by far the most valuable physical sign, and if combined with displacement of the heart to the opposite side, is almost diagnostic of fluid; but in localized empyemata this latter sign is frequently absent. Too much reliance should not be placed on auscultation. The breath sounds over a small collection of fluid, though often weak, may sometimes be loud and markedly bronchial, thus suggesting unresolved pneumonia; however, friction sounds and râles will be absent in the case of effusion, while in pneumonia the dulness and bronchial breathing may have a lobar distribution. The needle is often necessary to distinguish between these two conditions.

Exploratory puncture of the chest is, however, not free from risk. In three cases under my own care pneumothorax was produced. They were all hospital cases, and the needle was inserted with the usual precautions by house physicians who had frequently punctured the chest previously. In one of these cases a small amount of subcutaneous emphysema also developed. In all the cases the pneumothorax was limited in extent, caused no great distress, and no bad symptoms followed, the air being rapidly reabsorbed. Unfortunately, sometimes more serious accidents may follow exploratory punctures, as was illustrated by a child under my care at the North-Eastern Hospital for Children last year. The child, aged 4 years, was admitted with a history of a chronic illness of at least two months' duration. She was thin and cachectic; there was extreme dulness over the lower part of the chest on the left side, including both axillary and subscapular regions, and over this area the breath sounds were harsh and faint. The heart appeared to be normal in position. The temperature varied between normal and 102° F. There was no sign of disease of any other organs, except that the bowels were somewhat irregular. My own diagnosis was chronic interstitial pneumonia following unresolved pneumonia; but the house-physician asked to be allowed to explore the chest in order to exclude the presence of fluid. The ordinary exploring needle was introduced in the posterior axillary line and in the eighth intercostal space to a depth of between one and one and a half inches. No fluid was found, and no blood followed the puncture. The child, however, at once turned pale and the pulse began to get small, and frequently about a teaspoonful of frothy blood escaped from the mouth, and the child died within two minutes of the puncture. At the post-mortem examination the lung was found cirrhotic; one or two of the bronchi supplying the lower lobe were full of blood. The stomach was also found distended with blood-clot. It was found that the puncture had entered the lung well above the diaphragm, and the blood in the stomach was blood which, coming from the lung, had been swallowed.

This is by no means a solitary example of an exceedingly rare occurrence, though, as it is human nature to prefer to record successes rather than failures, very few cases are published. However, I can mention other similar cases. Dr. Fortescue Brickdale related at the Society for the Study of Disease in Children an exactly similar one in a child, aged 2 years, who was suspected to have empyema; and Dr. George Carpenter published in 1893[2] a case of a girl, aged 5 years, who was suffering from cirrhosis of the lung, and whose chest was explored by the house-physician. The post-mortem appearances in this case were identical with those of my patient. Dr. Thomas Oliver[3] and Dr. A. E. Russell[4] each reported three similar cases.

It seems to me that there is special danger in exploring cases of chronic pneumonia, for in seven out of the nine cases referred to this was the condition of the lung at the point explored. Death from this cause also seems more common in children than in adults, for six out of the nine cases were in children under 8 years of age. The cause of death is generally syncope, which Dr. Russell attributes to reflex action through the vagus, which for some reason or other is in a condition of hyperexcitability. This syncope, with its accompanying cerebral anemia, may produce death within a few minutes, as in most of the cases; or convulsions or delirium may come on and the patient may linger for a few days, as happened in Dr. Russell's cases—one living five and the other three days.

A large pericardial effusion in a child may give rise to extreme difficulty of diagnosis; for, owing to its pressure on the root and adjacent part of the left lung, there may be very considerable dulness over the lower part of the chest on that side, with weak or bronchial breathing and voice sounds. In many of these cases the diagnosis during life is pneumonia and the pericarditis is overlooked, the real condition of things being only discovered at the necropsy. In most of the cases the illness commenced with signs of pneumonia and there were no symptoms or signs of pericarditis.

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[2] The American Journal of Medical Sciences, October, 1893.
[3] The Lancet, January, 1904.
[4] St. Thomas' Hospital Reports, 1898.

For example, a male child, aged 12 months, was admitted into the North-Eastern Hospital on April 26, 1905. He was well until April 20, when he appeared to have headache, and to be ill. The next day he had general convulsions, since which there was fever and dyspnea. On admission the temperature was 102° F., pulse 120, regular, respirations 40. He was pale and thin, with sunken eyes. The cardiac impulse was in the fourth intercostal space, half an inch internal to the left nipple line; there were no abnormal sounds to be heard over the cardiac area. There was dulness on percussion over the lower part of the axillary region and below the angle of the scapula on the left side, extending forward to join the cardiac dullness, which did not appear to be enlarged upwards or to the right. In the axilla the breath sounds were weak and distant; behind they were louder and tubular in character, with numerous fine râles during inspiration. The child, who on admission was obviously very ill, died the next day. At the necropsy the greater part of the lower lobe of the left lung was found to be collapsed, with no sign of pneumonia or pleurisy. On opening the pericardium fifteen ounces of thin pus escaped and flakes of lymph were numerous, especially attached to the visceral pericardium. The heart appeared to be dilated, but there was no evidence of endocarditis. There was some recent lymph on the pia arachnoid in the region of the optic chiasma and a few tubercles were seen on the vessels in the Sylvian fissures.

Primary bronchopneumonia in young children may give rise to mistakes in diagnosis in at least two ways. The onset of this disease is frequently attended by very marked cerebral symptoms, such as extreme head-retraction, strabismus, Kernig's sign, vomiting, and so on. Two cases in which this difficulty occurred were reported by Dr. Baumann and most of us have met with similar cases. The difficulty is much increased if the physical signs in the chest are indefinite, few, or absent. It is a rule, however, for the cerebral symptoms to subside after a day or two, and at this time the physical signs in the lungs often become more definite. The rise of temperature in pneumonia is generally higher than in the early stage of meningitis, and dyspnea and cyanosis are more marked. In children under 5 years Schroeder has found that pneumonia occurs at the apex in 44 per cent.—hence the importance of thoroughly examining this part of the chest—while I have occasionally found signs of pneumonia which have been previously overlooked by careful examination of the upper part of the axillary regions.

The amount of dullness present in pneumonia naturally varies with the amount of consolidation, and as this is frequently patchy, with intervals of healthy lung, the percussion note may in some cases be actually hyperresonant instead of dull. The breath sounds, however, remain bronchial, and the sharp crackling râles so characteristic of pneumonia in young children will generally be heard.

In secondary bronchopneumonia the symptoms are usually well marked: prostration, high fever of a remittent type, rapid breathing, cyanosis pointing decisively to thoracic disease, and signs of bronchitis are always marked in these cases, the signs of bronchopneumonia naturally varying with the size of the patches and their relation to the surface, the most reliable signs being bronchial breathing and numerous sharp crepitations during inspiration, with bronchophonic cry. In small patches of consolidation the resonance of the surrounding lung often masks the dullness and so gives rise to confusion if this physical sign be relied upon. A common mistake is to overlook some disease of which the bronchopneumonia is a complication; for example, the bronchopneumonia of measles may come on very early before the rash is due, and then the rash is often scanty and very ill-defined.

If bronchopneumonia complicate whooping-cough, the characteristic whoop may disappear, and if the history be not clear the diagnosis may be impossible.

It is striking how few mothers of the hospital class recognize a whoop, and so the difficulty of an accurate diagnosis is immensely increased.

The diagnosis between bronchopneumonia and tuberculosis of the lungs is attended with the greatest possible difficulties in many cases of protracted chest disease. If the patient be old enough to expectorate and tubercle bacilli be found in the sputum, that is, of course, positive evidence; but in young children expectoration does not take place. Holt recommends the introduction of a stomach-tube into the esophagus and examination of the mucus which adheres to it when withdrawn. On one or two occasions I have induced vomiting and stained any mucus which is voided. Tuberculin is, as a rule, not admissible, and, indeed, may be useless on account of the fever which is generally present. The presence of enlarged glands in the neck or elsewhere points strongly to tuberculosis.

The following case illustrates the difficulty of determining whether a chronic fibrosis of the lung is bronchopneumonic in origin or tuberculous. A boy, aged 4½ years, was under my care recently at the North-Eastern Hospital for Children. His family history was very indefinite. He was said to have been ailing since an attack of measles six months previously. He was undersized, thin, and anemic. The temperature varied between 98.5° F. and 99.5° F. The skin was dry and rough, and the finger-ends clubbed. The chest was flat, and appeared smaller on the left side, which moved less than the right. At the level of the nipple the half circumference was 25½ cm. on the left side and 26½ cm. on the right. The heart's impulse was seen in the mid-axilla on the left side. There was hyperresonance over the whole of the right lung back and front, and this extended across the mid-line almost to the anterior axillary line on the left side. The note over the left axilla and back was extremely dull. On auscultation, the breath sounds over the resonant area were puerile and loud, with a few fine inspiratory râles; over the dull area the breath sounds were weak and in places bronchial, and accompanied by fine scattered crepitations and crackling sounds. The stomach resonance reached to the fifth rib, in the left mid-axilla. The other systems showed no sign of disease. There was frequent cough, but no expectoration. An emetic, however, brought up a quantity of muco-pus, and several of the most likely-looking masses were stained and examined for tubercle bacilli, but without positive result. All we can be sure of in this case is that there is a chronic fibrosis of the left lung, with much contraction, but whether due to a chronic tuberculous process it is impossible to say definitely, though there is some reason to think that it is a sequel of bronchopneumonia.

Now and then we meet with children who have had a chronic lung disease extending over months, or even years, and whose chief symptom is a severe paroxysmal cough, attended by an occasional whoop, and occasionally during each paroxysm of cough there is a most definite whooping, exactly resembling that in pertussis. The physical signs are generally those of fibrosis of the lung or bronchiectasis, and owing to their long duration most of these patients are lost sight of; but I have been fortunate enough to see two necropsies on such cases, and in both a marked feature was enlargement of the bronchial lymphatic glands lying in proximity to the bifurcation of the trachea, and displacing by pressure the left vagus, which in one case seemed partially flattened out. In addition there was marked bronchiectasis of the bronchi supplying the lower lobe of the left lung, in one case produced probably by pressure of the enlarged glands on the main bronchus to this lobe, while in the other there was fibrosis of this lobe.

The clinical history of such cases is well exemplified by the following notes:

In October, 1903, a little girl, aged 1 year and 8 months, was admitted into the North-Eastern Hospital for Children, with evidence of pneumonia in the lower lobe of the left lung; the fever lasted at about 103° F. for three weeks, and then descended slowly to normal. Towards the end of November the temperature rose to 103° F., and remained intermittently for a week; early in December, as the physical signs still persisted at the base of the left chest, an exploring needle was inserted and a drachm or so of pus removed, containing large numbers of pneumococci. A rib was resected, but only a very small quantity of pus escaped. The abnormal signs of dullness and bronchial breathing, persisted, but the general condition of the child improved, and on February 16, 1904, she was sent to a convalescent home in a fairly satisfactory condition, though the dullness, bronchial breathing, and friction sounds persisted over the lower lobe of the left lung. In January, 1905, the child was readmitted and was stated to have coughed ever since leaving the convalescent home, the cough being attended by marked whooping. This whooping was confirmed on admission to the hospital, the Sister informing me that she had a severe paroxysmal cough and whooped distinctly three or four times each day. She was now thin and cachectic-looking, with marked clubbing of the fingers and slightly of the toes. Over the whole of the lower lobe of the left lung the percussion note was dull, the breathing bronchial mostly, but in several spots it was cavernous, and all over were numerous fine sharp râles.

A little sputum obtained contained no tubercle bacilli. The temperature was normal, except for an occasional rise to 101° F. or 102° F. every few days. There was no displacement of the heart.

The diagnosis here was chronic fibrosis of the lung, with, perhaps, bronchiectasis following bronchopneumonia, and it is possible the bronchial glands may be chronically enlarged, pressing on the vagus, producing the paroxysmal cough and whoop. I am watching two other similar cases at the present time, one of which has whooped at intervals during the last four years.

In some cases of enlargement of these glands on bending the head backwards a venous hum may be heard over the sternum and neck; this sign, which was described by Dr. Eustace Smith, was absent in my cases.

The X-rays give sometimes positive evidence of enlargement of these glands, but unless their shadow is well marked it is difficult to distinguish it from that produced by the general mediastinal tissues.

Pressure of these enlarged glands sometimes produces attacks of paroxysmal dyspnea, which may be mistaken for asthma if their pressure is not recognized. The pressure of an abcess from tubercular caries may produce identical symptoms as the above, but is more apt to produce symptoms of obstruction of the air-passages; the diagnosis of such cases is made by the recognition of spinal disease in the upper dorsal region.

In a case of this kind, under the care of Mr. Douglas Drew, which I saw with him, the abscess started from a caries of the fourth and fifth dorsal vertebræ, and caused considerable dyspnea by pressure on the bifurcation of the trachea. The specimen was shown by Mr. Drew at the Society for the Study of Disease in Children.

A CASE OF TUBERCLE OF THE CHOROID, PRESENTING CERTAIN CLINICAL AND PATHOLOGICAL PECULARITIES.[1]

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AND

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In our collective experience tubercle of the choroid is scarcely sufficiently uncommon to justify the publication of a single case. At the same time, the one we are about to relate possesses some clinical and pathological peculiarities marked enough to warrant a brief account of its main features.

The facts are as follows:

Ada S——, aged 3 years, was admitted into the North-Eastern Hospital for Children, London, on July 23, 1903, suffering from "bronchitis and convulsions." According to the history, the child had been well until about two weeks before admission, when she was noticed to breathe noisily at night and to be short of breath during the daytime. The personal history was unimportant, except, possibly, for the fact that the child had contracted measles when 12 months of age. The parents were healthy. There was no family history of tubercle, although it is somewhat significant that the other children in the family are said to be subject to bronchitis.

Upon admission.—The child, whose weight is 24¼ lbs., has a slight cough, but, beyond a few rhonchi at the base of each lung, no physical signs can be made out in the chest. Temperature 101° F., pulse 124 to the minute, respiration 52 to the minute.

Progress and termination.—July the 29th, 1903: The spleen can be felt to extend 1½ fingers'-breadths below the costal margin. The child now weighs 24 lbs., or a decrease of 4 ozs. as compared with the weight on admission into hospital. August the 4th, 1903: The child's temperature since admission has ranged from 97.6° F. to 103° F., and has usually shown a tendency to rise at night to within 102° F. and 103° F. Respirations have varied from a minimum of 32 to a maximum of 76 per minute. The pulse-rate has been from 100 to 160 per minute, and it may be noted that the rate, as a rule, has been somewhat less at night than in the morning. The respirations are rapid and somewhat labored, and the slightest exertion brings on dyspnea and cyanosis. Resonant note all over the chest; a few rhonchi and râles can be heard. August the 6th, 1903: Beyond a few bronchitic accompaniments little to be heard in chest, which is resonant. The respirations are very frequent (64 to 92 per minute) and out of all proportion to the physical signs that are present. The liver and the spleen are slightly enlarged. Temperature 100° F. to 102° F., pulse-rate 152 to 168 per minute. Ophthalmoscopic examination revealed the following conditions: Neither optic papilla is well defined; retinal veins large and somewhat tortuous; retinal arteries relatively small and inconspicuous. Each fundus oculi contains numerous fawn-colored tubercles, ranging in size from those that are almost equal to the optic disc in diameter to others having a diameter about equal to one-quarter of the disc. They are round or oval in shape, and are discreetly arranged almost exclusively in the neighborhood of the optic disc and yellow spot—that is to say, in the so-called "central region" of the fundus. The yellow spot region itself is not invaded. Several of the tubercles are crossed by the retinal vessels, which manifest no local changes. The number of individual tubercles in each eye was computed as twelve. Close examination by the direct method showed that the fawn-colored surface of individual tubercles was stippled with fine retinal pigment which, for that matter, was present over the unaffected parts of the fundus.

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[1] Brit. Jour. Chn's. Dis.

In face of the foregoing discovery, a diagnosis of acute miliary tuberculosis was made upon this date (August 6, 1903).

The child died comatose on August 11, 1903—that is to say, thirty-three days after the beginning of the illness, nineteen days after admission into the hospital, and five days after the diagnosis was made.

Autopsy.—The post-mortem examination, made twenty hours after death, revealed typical acute miliary tuberculosis, affecting specially the lungs, spleen, and choroid. The protocol was as follow: The lungs were very edematous and studded with numerous miliary tubercles, but neither yellow nodules nor caseation was seen. The pleura was free from tubercle. A few tubercles were found in the pericardium. Although the bronchial glands were not much enlarged, yet some of them included tubercles. The bronchi contained mucus in some quantity. The larynx and trachea were free from morbid changes. The brain was normal, except for the presence of a few fine miliary tubercles in the Sylvian fissure and on the cerebellum. Miliary tubercles were also found in the spleen, kidneys, and liver, the latter of which showed fatty changes. The mesenteric glands were not enlarged. There were several ulcers (? tuberculous) on the external surface of the ileum, although none were found in its mucous membrane. Bladder, uterus, ovaries, and peritoneum were free from tubercle.

Pieces of the lungs and spleen were removed for microscopic examination. The eyes were placed unopened in formol, 10 per cent.

Microscopical examination.—(*a*) The *spleen* presented a typical picture of tuberculosis, being literally riddled with many giant-cell systems of the most characteristic kind. Tubercle bacilli were found. (*b*) The *lungs,* or at least those parts submitted to the microscope, also revealed numerous miliary tubercles. The intervening areas were consolidated. The consolidation consisted of cellular products in the alveoli. Some of the cells were of very large size, but for the most part were of moderate diameter with single nuclei. The alveoli in many cases contained also cells with horseshoe-shaped and multiple nuclei. In parts the alveoli were stuffed with fibrin plugs which contained but few cellular elements. Infrequently a combination of the catarrhal and the fibrinous process was noticed. The alveolar walls were thick, proliferating, and engorged. The bronchial tubes had shed their mucous membrane and the smaller ramifications were stuffed with cellular products. Tubercle bacilli were demonstrated without difficulty. (*c*) The *eyes* were frozen, and bisected in a plane parallel to the horizontal meridian. Each hemisphere thus obtained was divided into an anterior, a middle, and a posterior third, each of which was then imbedded in celloidin and cut for the microscope. Slight inflammation of the optic nerve was present, as evidenced by the swelling of the papilla, the increased number of nuclei and of capillary vessels in the nerve, and the exudation of inflammatory products into the intersheath space.

Beyond this neuritis, the only ocular lesions found were those characteristic of acute disseminated miliary tuberculosis, namely, local accumulations of small round cells, with a few giant-cells of the Langenhans type, situated in the thickness of the choroid, and free from pigment. Some of the choroidal tubercles showed more or less central areas of caseation, as evidenced by the absence of defined elements and imperfect or peculiar reaction to such stains as hematoxylin, eosin, acid fuchsin, and picric acid. Some of the choroidal tubercles showed vertical or transverse sections of the choroidal vessels, the walls of which had undergone endarteritis.

There were two pathological curiosities about the specimens. In the first place, there appeared to be in places a general infiltration of the choroid with small round inflammatory cells; and, secondly, a few outlying areas of tubercle of the retina were found.

The drawing represents a typical tubercle formation in the choroid. A fusiform mass of small round cells occupies practically the entire parenchyma of the choroid between the lamina vitrea, which is intact, and the suprachoroid, which is also preserved. Towards the centre of the tubercle lie six giant cells, the nuclei of which are arranged towards the periphery. The pigment layer of the retina is in place. A close examination of the choroid beyond the tuberculous formation shows that the choroid contains a number of small round cells. In other words, in this particular case a kind of general tuberculous choroiditis is present, in addition to the simple deposition of miliary granulomata. A few of the sections showed outstanding nodules of retinal tuberculosis— *i. e.* nodules occurring independently of the choroidal deposits. One of these nodules is sharply bounded externally by the retinal pigmented epithelium, here cut rather on the slant. The inner nuclear layer can be traced over the nodule almost in an unbroken layer. The nodule itself is composed of elements almost identical with the neurons of the outer nuclear layer, with which, indeed, it appears to be structurally continuous. No other elements can be recognized in the nodule, a point that at once raises the question whether it is to be regarded as tuberculous at all. Whatever hesitation we might have felt upon this point at first was conclusively laid at rest later by finding a couple of tubercle bacilli in one of the retinal nodules. Tubercle bacilli were also demonstrated in several of the choroidal deposits in more or less close relationship with the giant cells. The anterior part of the eye, including the iris and ciliary body, included no tuberculous deposits.

Comments.—This case illustrates once again a fact that can scarcely be too widely recognized, namely, that by far the most trustworthy sign of acute miliary tuberculosis is furnished by the discovery of tubercles in the choroid coat of the eye. As regards the present case, the progressive wasting, the oscillating temperature, the rapid pulse, the cyanosis, and especially the hurried respirations without adequate physical causes, undoubtedly pointed to acute tuberculosis as the probable underlying disease. The condition, however, could never have been diagnosed with certainty on that slender evidence. The discovery of tubercles in the choroid settled the matter once and for all, in a way that nothing else could possibly have done. Despite recent statements to the contrary, we repeat that tubercle of the choroid is not uncommon. We recall the fact that in a former communication upon the subject ("Reports of the Society for the Study of Disease in Children," vol. i, 1901, p. 169) we found it to be present in exactly 50 per cent. of the forty-two cases of acute miliary tuberculosis and tuberculous meningitis that we examined with the ophthalmoscope. It is, therefore, not only a certain but also a common sign of the conditions named.

The present case, as we have already said, presents two peculiarities, viz. a clinical and a pathological one. The usual clinical picture of acute tubercle of the choroid, as we have pointed out before (*loc. cit.*), is that of one to three round, oval, or reniform areas, of usually fawn color, and not sensibly raised, situated near the optic disc and macula lutea. The characteristic lesion, as we then stated, is generally small, single, and limited to one eye. The case just related is therefore altogether exceptional, since the choroidal deposits are present in both eyes, are multiple, and, speaking broadly, are of unusually large size.

The pathological invasion of the retina by tubercle is, in our experience most uncommon. We have searched through dozens of microscopical specimens, taken from upwards of twenty instances of tubercle of the choroid, without having succeeded in finding this change, except in specimens taken from the present patient. It may be safely asumed, therefore, that foci in the retina in association with miliary tuberculosis of the choroid are anything but common. An even more uncommon finding would be a deposit of tubercle in the retina apart from any choroidal change. Yet such cases have been reported amongst others, by W. A. Brailey (2), O'Sullivan and Story (3), Sattler (4), and, quite recently, by A. Knapp (5), Spaulding (6), and Hancock (7).

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SOCIETY PROCEEDINGS

SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN

January 19, 1906.

DR. PORTER PARKINSON, Chairman.

CUTANEOUS PIGMENTATION.—Mr. Arthur Edmunds exhibited a child who showed upon the back and buttocks a cutaneous pigmentation of a bluish tint and mottled character. Such pigmentation is not uncommon in Asiatic races of mixed descent, and has been held by some to indicate a negroid ancestry. Others deny this, and in the present instance no trace of such ancestry could be discovered. Some time ago a Japanese child which exhibited a similar condition had been shown at a meeting of the society. Mr. Edmunds considers the case one of melanism, analagous to the well recognized phenomenon of albinism.

SCLEREMA NEONATORUM.—Dr George Carpenter and Dr. Porter Parkinson exhibited a female infant of eight weeks which showed a brawny induration extending over the back and back of the neck, together with the buttocks and the upper part of the posterior aspect of the thighs. Two small areas over the occipital portion of the scalp were also found. The child had been asphyxiated at birth and revived by artificial respiration. At present it weighed 20¼ pounds and seemed healthy. Circulation in the indurated areas was sluggish. There was no pitting on pressure, and no change in the sclerema had been observed since birth. A trace of albumin was constantly present in the urine.

Another case was reported, that of an infant born at eight months and dying ten days later. No family history of syphilis was obtained, in fact the family history was distinctly good. The child weighed 4¾ pounds at birth and had indurated areas of a reddish yellow color over both cheeks, eyelids and buttocks and over the spines of the scapulae and clavicles. These patches did not pit on pressure. The child was unable to suck, and it was found that the tongue was also indurated. The temperature varied between 96 and 97 degrees F. The child died from asphyxia, after surviving several attacks in which the breathing was interrupted. Microscopical specimens of the skin showed nothing more significant than thinning of the epidermis with considerable thickening of the cutis vera seemingly due to increase of fibrous tissue.

Lipomatosis.—Dr Leonard Guthrie showed a case of lipomatosis in a child who possessed a normal weight and height, 32½ pounds and 2 feet 8 inches, but who looked very fat. The fat appeared in masses around the neck, over the lower cervical and upper dorsal vertebrae, in the posterior folds of the axillae and in the ilio-inguinal region, in addition to a general distribution. An abnormally light skeleton probably accounted for the discrepancy between appearance and weight. The child was bright mentally, but had "no life in her" and always wanted to sleep. She complained of pain in face and head, and often grew blue and cold. Her hands and feet were cold, the heart action rapid, irregular and intermittent. The thyroid gland could not be felt. The child was under thyroid treatment, and lost 1¼ pounds in three weeks.

Hemihypertrophy.—Dr. George Carpenter and Mr. Lockhart Mummery showed a child 2½ years old in whom the left side was larger than the other, the unequal growth having been noticed since he was 18 months old. The left leg was an inch longer than the right, and the limp caused by this inequality had been the occasion of bringing him to a doctor.

Cyst in the Breast.—Dr. George Carpenter showed a male infant a year and a half old with a soft, movable, elastic swelling in his breast. It had been observed immediately after birth, and was then somewhat larger than at present. Exploratory puncture discovered a contents resembling milk in appearance and also micro-chemically.

Congenital Hypertrophic Stenosis of the Pylorus.—Dr. George Carpenter showed a specimen which has been taken from a child four weeks old. The child seemed healthy at birth, but invariably vomited after each nursing. Various modifications of artificial feeding were tried, but none successfully. Vomiting and loss of weight continued, and stomach washings, rectal injections of normal saline solution and small doses of opium alike proved ineffectual. A small tumor could be felt in the region of the pylorus. Mr. Ewen Stabb did a gastro-jejunostomy, but the child died of shock six hours later. The stomach capacity was found to be 1¼ ounces and the pylorus admitted a No. 2 catheter, but fluid could only be expressed drop by drop under hydrostatic pressure. The stomach walls were thickened, and the pylorus very hard.

Dilatation of the Heart.—Dr. George Carpenter and Dr. Theodore Fisher read some notes of a case of dilatation of the heart which proved fatal in a boy eight years old. The patient had exhibited symptoms of cardiac failure for a year previous to his death, but had had no rheumatism except an attack but four months before. The heart was found on autopsy to be hypertrophied as well as dilated. It weighed 10½ ounces. There was no adhesion of the pericardium and no valvular Disease. Fatty degeneration of the cardiac muscle was quite marked microscopically.

Congenital Sacral Tumor.—Mr. Arthur Edmunds reported a case in which he had removed a congenital sacral tumor from a girl 18 months old. The tumor was as large as an orange and had two parts, a solid part and a cystic part. Fat, with coarse strands of fibrous tissue running through it, constituted the solid portion. A small bone with cartilage covered ends was also found. A branched tube, containing the small, fatty epithelial balls common to dermoid tumors, ran through the middle of the tumor. The lining of this tube resembled that of the large intestine. In parts it consisted of typical stratified epithelium, and in others of columnar epithelium with tubular glands. The cystic portion contained a semi-purulent material.

Congenital Absence of Skin.—Dr. J. G. Emanuel showed a child born dead at full term, showing in certain areas a complete arrest of development of the epidermis and hairs. The cutis vera was not affected except in so far as hair follicles, sweat and sebaceous glands were lacking. No signs of skin eruption were present, and there was no family history of syphilis. The hands, legs and feet, together with certain areas over the temples, bridge of nose and in the lumbar region exhibited the peculiar condition. These parts were smooth and transparent, the delicate blood vessels being clearly seen through them.

Erythema Multiforme.—Dr. Percy Lewis showed some photographs of a boy eight years old suffering from this condition which Dr. Lewis considers one of toxemia due to improper feeding.

EDITORIAL

INSPECTION THAT INSPECTS.

Just at the present time when so much excitement is rife concerning abuses in the meat packing business and the apparent failure of government inspection to secure results, it is reassuring to the general public to receive demonstration of the efficiency of food inspection as far as regards New York City. It is not so very long ago that New York was the target aimed at by every dealer who found himself burdened with food-stuffs which had long since surrendered or should have surrendered their claim to availability as such.

This deplorable state of affairs came to the attention of the Health Department and occasioned investigation which ultimately resulted as the problems unfolded in the installation of the present efficient system of municipal food inspection. That the development of this system was not the work of a day can be readily conceived by anyone who reflects upon the vastness of the field to be covered. Adequately to ascertain the fitness of a food supply for 4,500,000 people is a colossal task, and anyone might be pardoned for doubting its accomplishment, yet obstacle after obstacle has been surmounted, and to-day it is an undisputable fact that the population of this city enjoys a degree of protection in this respect which approaches more nearly the absolute than one would suppose possible under such complicated conditions.

Even on the East Side where the swarming population has little regard for hygiene, despite the ancient laws of its Hebrew contingent, and ignorantly demands cheap food at any risk to life and health, signal reforms have been carried through. The largest and most obvious item in the East Side account is the creation of the Williamsburg Bridge market. Here on market days, Tuesdays and Fridays, the pushcart men, so long the harried Ishmaels of the street, find each his allotted position, identified by boundaries and numbers painted on the asphalt, and vend their wares under the protection and regulation of the city government. The creation of this market has contributed largely to relieving the obstruction and mitigating the filth in certain streets where these pushcarts were wont to congregate and where no restraint was imposed upon vendors and customers in the disposal of the refuse. Under the present régime they are not only obliged to place all refuse in receptacles provided for the purpose, but are also required thoroughly to scrub the carts after the day's work. Both push carts and corner stands where dried fruits and candies are for sale must be provided with glass covers as a protection against disease laden dust.

Another point of attack on the East Side was found in the numerous small bakeries and meat shops. In many of the former the business was carried on in the same room where the family lived, partitioned off occasionally it is true, with a petticoat or other articles of apparel which had seen active service. For this simple method of separating the business industries and household activities the present régime substitutes a close partition without door or other means of communication. Other safeguards against bacterial invasion are employed, but this particular feature is representative of the practical nature of the means adopted.

In the meat shops, in spite of the fact that many of them come under under the domain of the Hebrew dietary laws, room was found for reform. Tainted meats of all sorts are searched out and condemned, and in some instances purchasers are protected from frauds aimed rather at the pocket book than at the body economy.

Yet, notwithstanding the fact that the most strikingly repulsive conditions were met upon the East Side, it must not be supposed that the need for municipal food inspection was confined to that portion of the city. Indeed, viewed in certain aspects, the necessity is even greater where the consumers themselves have a more intelligent idea of what constitutes hygenic food supply, and are anxious to secure it, but have no criterion by which to judge their purchases other than the so often deceptive appearances. No matter how willing a man may be to pay the price for gastronomic perfection, he is comparatively helpless unless fortified by a scientific administration of a competent board of inspection. Such an administration implies facilities for a searching observation, in the gross as well as bacteriologically and chemically, of all food-stuffs brought into the city for local consumption. Both the variety and the quantity of material arriving daily contribute to the magnitude and intricacy of this task.

With the process as applied to the milk supply the public is fairly familiar, but it is safe to say that comparatively few realize that not only milk but all the meats, fruits, farm produce, mineral waters, canned goods and synthetic products, in fact everything intended to contribute to body metabolism or Epicurean delight, are equally subject to the scrutiny of the department inspector. Inspection in the gross, where such can be made effective, is carried out, and for the great bulk of commodities this is adequate; but where necessary in order to determine a more exact availability, provision is made for chemical and miscroscopical examination of samples purchased in the open market at sufficiently short intervals to preclude evasion of results. This latter applies more particularly to canned goods, since here the latitude for imitation, substitution and adulteration is greater. How far this may be carried is conspicuously before the public at present in the pages of "The Jungle" and the report of the investigation of the packing industry. But it is not meats alone that are subjected to such disguising processes. It would seem that an egg once become suitable for campaign ammunition would defy the best intentions to render it salable as food, yet an ingenious and thrifty dealer, by a judicious blending of assorted ages mixed with a certain amount of water and frozen, furnished bakers with a cheap canned product which was incorporated in pastries and passed on to the unsuspecting consumers. The profits in this transaction, however, were seriously cut down by the heavy fine imposed upon the originator. This is only one of many instances in which departmental interference has stood between the unscrupulous perpetrator of fraud and his unconscious victims.

Doubtless, it would be claiming too much to assert that the municipal ordinances are adequate to every occasion and never evaded. The work of the Health Department in this direction is a constantly recurring task, and as long as there exists the psychic condition which turns naturally to the effort to get something for nothing, so long will fraud be continually attempted in the field of food supply, no matter what advertised penalty may be attached to discovery and conviction. Naturally, in such a shoal of evil-doers, some of them escape the meshes of the law, but individual instances of this sort should in no wise produce a lack of confidence in departmental efficiency. In spite of occasional lapses the work is effectively conducted, and the mere fact that over 12,000,000 pounds of supplies were condemned as food and officially destroyed during the past year in itself bears graphic testimony to the good accomplished and the evils guarded against.

ABSTRACTS

On Impaction of Coins in the Esophagus in Children.—Caubet (Gaz. d. hôp., Paris, 1906, January 25) discusses the means of extracting coins from the esophagus of children by the natural channel. He points out that the use of the X-rays has shown that the seat of impaction is nearly constant, namely, at the level of the upper limit of the thorax. In a radiogram the shadow of the coin is seen just above the sternum, and a line drawn from one clavicle to the other usually crosses the centre of the coin. The shadow usually hides the last cervical and first dorsal vertebræ. The author notes, what has previously been remarked by Leriche, that the coin seems to lie to the right of the middle line, in spite of the statement of anatomists that at this level the esophagus deviates to the left. The explanation of this localization is that at the level of the fourth dorsal vertebra there is a natural constriction of the esophagus caused by the crossing of the aortic arch, and above this is a fusiform dilatation in which the coin lodges. Kirmisson has pointed out that in this dilated portion of the esophagus the coin lies against the anterior wall of the tube, while behind it there is an open space which permits of the food passing on, and this explains how children are able to swallow fluid food in spite of the presence of a coin in the esophagus. The distance from the upper incisor teeth to the lower border of the coin, in an infant, is about 15 cms. For purposes of diagnosis, the author recommends that reliance be placed entirely on radioscopy. The use of bougies is depreciated as uncertain and sometimes harmful, while esophagoscopy is difficult, and requires special training and much practice before it can be satisfactorily employed. As regards the means of removing these foreign bodies, the author advises that in all cases in which not more than fifteen days has elapsed since impaction took place, an attempt should be made to extract the coin by the natural passages. He does not favor the ordinary coin-catcher of Graefe, which he considers too large for the purpose, and, the recurved part being movable on a hinge, the anterior angle of the instrument is very liable to catch on the lower border of the cricoid cartilage. Numerous accidents have been reported in the use of this instrument. He prefers the single hook introduced by Kirmisson, which is smaller and more easily managed. External esophagotomy is rarely indicated for the removal of coins. It is only necessary when the body has been impacted for a long time and when the walls of the esophagus are softened by the pressure exerted by it, or by secondary inflammatory changes.

The Operative Treatment of Cleft Palate.—Charles N. Peck (Ann. Surg., New York, 1906, January) records his experience in the treatment of cleft palate. He considers the operation of Langenbeck the procedure of choice in nearly all cases, either in adults or children. As regards the age at which the operation should be undertaken, he says the earliest age to operate is from six to ten years, although he admits that "the best age probably is from two to three years, if it can be demonstrated that the danger is not too great." The bellies of the levator and tensor palate, with their insertions into the palatine aponeurosis, should be preserved; but the attachment of the aponeurosis to the posterior margin of the hard palate must be divided, together with the mucous membrane on the nasal aspect of the velum. He has found a device suggested by C. H. Mayo useful in relieving tension. After the sutures have been tied up, and the edges of the palate thus brought together in the middle line, a piece of white tape is passed around both flaps through the lateral incisions, drawn just tight enough to approximate the flaps slightly, and to guard against tension, and secured by a silk ligature. The ends are cut short and shifted round to the nasal aspect of the flaps. This is left in place for seven days, and serves for drainage as well as for the relief of tension.

Gonorrheal Stricture of the Rectum.—Arnaud (Gaz. d. hôp., Paris, 1906, February 3) contributes a paper in which he shows that stenosis of the rectum as a result of gonorrheal infection is more common than is usually suspected, and that many cases hitherto supposed to be of syphilitic origin are in reality due to gonorrhea. The gonorrheal infection may be primary and direct, or it may be due to discharge from the urethra or vagina passing back and reaching the rectal mucous membrane. It has frequently occurred as a sequel to vulvo-vaginitis in little girls. Gonorrheal stricture is met with much more frequently in women than in men. The stenosis is the result of the inflammatory reaction associated with gonorrheal infection of the mucous membrane, followed by ulceration. This inflammatory reaction is extremely chronic and intractable. The clinical features are those common to all forms of inflammatory stricture, and the condition may be complicated by ano-rectal fistulæ, peri-rectal cellulitis, and suppuration. It is usually very difficult to make an absolute diagnosis unless gonococci be found in the discharge from the rectum. Treatment is carried out on the same lines as for other forms of inflammatory stricture.

Etiology and Dietetic Treatment of Infantile Atrophy.—WENTWORTH (Journ. Am. Med. Assoc., 1905, August 25). While it is generally believed that infantile atrophy owes its origin to a combination of dietetic errors, the exact manner in which faulty diet produces the condition is still unknown. Nothnagel, and following him Baginsky, assumed that a constant derangement of digestion caused atrophy of the intestines, interfering with absorption, and thus bringing about general wasting of the tissues of the body. In support of his view, Baginsky produced drawings illustrative of the microscopic appearances of the intestines in such cases. Heubner, Gerlach, and Bloch (Jahrb. f. Kinderh., Leipzig, 1901, Bd. liii.) have disputed the correctness of these findings, and claim that the microscopic appearances described by Baginsky are due to post-mortem changes. Bloch has recently published the results obtained by him from the examination of three cases of infantile atrophy (Jahrb. f. Kinderh., Leipzig, 1904, Bd. lix.). Post-mortem changes were avoided by injecting a quantity of a 10 per cent. solution of formalin into the peritoneal cavity immediately after death, and in none of the cases was there any appearance of intestinal atrophy. The only abnormality to which he attached any importance was the condition of Paneth's cells, which are found in Lieberkuhn's ducts. These cells did not contain the granules which are supposed to be evidence of their functional activity. Bloch attaches great importance to the condition of these cells as a causative factor in the production of atrophy, and he maintains that their condition is a primary one, and is not induced by the atrophy. In describing the liver changes, Bloch says that in no case did he find any inflammation or cirrhotic appearance. On the whole, therefore, it may be said that there is no convincing evidence of any constant gross or microscopical changes in the intestines or liver in infantile atrophy beyond the possible absence of Paneth's granules. The strongest argument against the theory of intestinal atrophy is furnished by the rapidity with which the infant gains weight when a suitable food is given, exceeding the average gain made by a normal healthy infant. It is inconceivable that repair of a serious structural lesion could occur so completely or so rapidly. It is probable that impaired intestinal functions and absorption are of chief importance in the production of the atrophic conditions in the infant. The assumption that chronic intestinal intoxication caused infantile atrophy has not up to the present time been satisfactorily demonstrated. In 1897, Czerny stated his belief that an excess of cow's milk proteid in the diet might produce an acid intoxication, which would impair the function of the liver (Jahrb. f. Kinderh., Leipzig, 1897, Bd. xiv.). In this belief he was supported by Keller and Van den Bergh. Pfaundler, however, disproved this theory, and came to the conclusion that a physiological hyperacidity is present in artificially fed infants whose food contains an excess of fats. His experiments on the amount of ammonia in the urine went to show that there was not an acid intoxication. The feeding with breast milk restores the function very quickly, and possibly there are ferments in breast milk which stimulate digestion (Jahrb. f. Kinderh., Leipzig, 1901, Bd. liv.). Three methods of feeding atrophic infants are discussed, namely, proprietary foods, cow's milk mixtures, and breast milk. In the majority of cases proprietary foods are unsuitable, though it cannot be denied that some cases of atrophy gain rapidly in weight and seem to thrive on these foods. These good results, however, are of little assistance to the physician as guides to treatment in similar cases, as they follow no definite rule, and often instead of proving serviceable are the cause of rickets and scurvy. Cow's milk mixtures are better, but they, too, are usually unsuitable. Heubner says that, in cases of atrophic infants more energy is expended in the act of digestion, and that it requires more calories per kilo, weight than in a normal infant in order to balance the extra energy lost in the intestines and absorbents during digestion. It is generally considered that cases of infantile atrophy digest and gain more on cow's milk mixtures when the percentages of fat and of proteid are low. This deficiency must to some extent be made up by increasing the carbohydrates, otherwise there is greater danger that the mixture will contain too little nourishment for the infant's needs. The fact that these infants absorb carbohydrates better than they do fats and proteids, probably explains the rapid improvement that sometimes follows the use of condensed milk and proprietary foods. It has been shown that a relatively small quantity of proteid is required to repair tissue waste as long as this small quantity is protected by a sufficient quantity of fat and carbohydrates. Metabolism observations seem to show that these infants possess the power of retaining proteid to a greater degree even than the average infant. Heubner points out that excessive quantities of proteid are therefore detrimental to these infants, as they require so much energy for their utilization. A majority of the cases of atrophy that recover on cow's milk mixtures do so on relatively small quantities of a mixture weak in fat and proteid. The interval between each feeding in these instances should be shorter than for a normal infant of the same age. Human breast milk is by far the best and most reliable food. In many cases even a few weeks of breast milk will produce such improvement in the weight, general condition, and digestive power of the infant, that it will be able to adapt itself to cow's milk mixtures if, for any reason, it becomes necessary or desirable to make a change.

A New Symptom of Tetany in Children—The Tetany Face.—UFFENHEIMER (Jahrb. f. Kinderheilk.) Uffenheimer gives several illustrations of children to show the peculiar expression illustrative of tetany. It may be observed even before any other signs are manifest. The muscles of the face seem to feel the influence of the impending tetany, and the face assumes an expression which is the first faint suggestion of the risus sardonicus of true tetany. He has observed more than fifty cases, his attention being attracted to the children by this tetany face. In every case the application of electricity and later events confirmed his diagnosis. Differentiation at this early stage allowed prompt treatment to be employed, and cured many of the children without the development of further symptoms of tetany, the Chvostek and Trousseau signs subsiding as the children's expression returned to normal. The muscles affected are those supplied by the facial nerve. The face is drawn up and wrinkled like that of a harassed adult, and assumes a worried and morose expression.

Infantile Paralysis of Abdominal Muscles.—(Johns Hopkins Hosp., Bull., Jan., 1906. In describing the muscular involvement in cases of infantile paralysis, it is seldom that the condition of the abdominal muscles is referred to, and the general conclusion seems to be that paralysis of the abdominal muscles is exceedingly rare. In the frequently widespread paralysis at the onset of this condition, it is possible that many cases showing participation of the abdominal muscles are overlooked, and as the tendency in the vast majority of cases is to rapid recovery, the initial paralysis of these muscles is possibly unnoticed. Seeligmüller, in his series of seventy-five cases, did not have a single case of back or abdominal muscle paralysis. In 340 cases described by Sinkler, in twenty-two of which there was involvement of the trunk muscles, in none were the abdominal muscles affected. Duchenne, Birdsall, Bernheim, and Leiner each describe one case. The following is the only case of residual paralysis of the abdominal muscles reported from the Johns Hopkins Hospital. The case is further interesting as presenting the crossed type of paralysis of the extremities. After an attack of fever lasting three days, in a child æt. 21 months, it was noticed that he could neither sit nor stand, and afterwards it was discovered that the right leg and left arm were paralyzed. In about a month movement had returned to both these paralyzed extremities, and the child could walk and use his arm fairly well. In the abdomen from the commencement of the illness there was asymmetry, which gradually became more apparent as the muscles became more flaccid and atrophic. In dorsal decubitus the abdomen was full, but more prominent on the right side. When the child cried and raised the intra-abdominal pressure, the right side ballooned out very markedly; on palpation the muscles on the left side contracted under the hand, but not on the right side. In the erect position the conditions were intensified. The asymmetry was much more prominent in this position, and the right side bulged out to the full limit of the flaccid and paralyzed abdominal wall. Skin reflex was present on the left, but absent on the right side of the abdomen. The paralyzed muscles were the oblique, the tranversalis, and half of the rectus abdominis on the right side. There was no lordosis present, but a slight scoliosis in the lumbar region, with a convexity to the right.

Buddized Milk.—LINDMAN (Nord. Medicinskt, Arkiv., 1905, Abt. 2, Anhang). The pasteurizing of milk is not a satisfactory process, as the nutritive qualities of milk so treated are impaired considerably, both for infants and young quadrupeds. One of the best of the alternative methods for preserving milk from bacterial decomposition is that invented by Budde, of Copenhagen; the milk is warmed to 50 degrees C., and a small amount of H_2O_2 is added to it. This sterilizes the milk.

The author describes the uniformly excellent results yielded by milk buddized at Helsingborg. The milk is strained, warmed to 34 degrees C., mixed with the H_2O_2 in a large glazed vessel, and kept moving for a certain time until all the H_2O_2 has been decomposed. It is then cooled to 18 degrees C., and put into stoppered sterilized bottles for consumption. Milk so treated has been found fresh after over six weeks' keeping. It is well adapted for infant feeding; it is also better than pasteurized milk for rearing stock.

On Nephritic Edema.—HOLTZNER (Med. Klinik). A girl, two and a half years old, who had nephritis with a moderate amount of albumin in the urine, accompanied by numerous hyaline and epithelial casts with fatty deposits, was put on strict milk diet. The symptoms became worse, and the patient was sleepless to an extraordinary degree. She was then put on salt-free regimen; the milk was diluted to one-half with potato and cauliflower broth, etc., prepared without salt. On the second day after the change in diet was made the general condition of the child began to improve, and the edema to disappear, although the weight of the child remained the same. This apparently was due to ascites. On the fourth day the edema had further rapidly disappeared with loss of weight. The albumin remained unaltered until the seventh day of deprivation of salt, when it began to lessen, and in three days had entirely disappeared. Höltzner believes that the primary action of salt-deprivation, in renal edema, is to diminish the edema; not until after its disappearance do the kidneys begin to amend.

Idiopathic Edema of Infants.—MEYER (Deutsch. med. Wochenschr., 1905). Idiopathic edema is that type of edema which occurs without the presence of albumin, or of casts, in the urine. It is much commoner in infants than in adults, with whom it is a very rare affection. In three infants suffering from idiopathic edema Meyer tried the effect of adding to and withdrawing common salt and phosphates from the food. He found that the dropsy was rapidly increased by adding common salt to the food; by withdrawing salt the edema was quickly dispersed. He attributes a like influence to the phosphates and the other salts contained in the food. Following Widal and Javal, Meyer regards idiopathic edema as the result of loss of function on the part of the epithelium of the renal tubules concerned in the elimination of salts, and consequent accumulation of salts in the tissues, which leads to retention of water. This may occur without any anatomical changes in the kidneys, or cardiac disorder. Meyer warns against the use of artificial foods in these cases, on account of the added salt they contain.

Infantile Scoliosis.—DESFOSSES (La Presse Médicale, January 3, 1906). The author refers to the varied lines of treatment recommended in scoliosis, and considers that their uniform lack of result is due to the fact that treatment is begun too late in the disease. It is not sufficiently recognized that many cases begin in infancy. This beginning may date from the first year of life. The early curve is situated in the dorsal region, and shows a long sweeping curve of large radius. Treatment should consist in early and efficient fixation on those lines which would be followed if the case were one of caries. Mention is made of the cases which supervene on infantile paralysis, and a description, with photograph, of such a case is given.

Malignant Ovarian Tumors in Children; with report of a case.—DOUHAUSER (Albany Medical Annals, 1906, p. 20.) The patient, a girl of thirteen, had suffered from repeated colicky pains in the abdomen and was operated on during a severe attack marked by vomiting and high temperature. The abdominal cavity contained much free and clotted blood, which had come from a ruptured ovarian cyst. This cyst was removed and the patient was discharged in four weeks apparently well. Five days after her discharge the pain recurred and vomiting became almost constant. A swelling on the right side of the abdomen was now apparent. An incision was made over the tumor, which was situated on the right side just below the liver. On opening the abdomen bloody fluid escaped. The peritoneum was swabbed out and drained, but the patient sank and died one month after operation. On post-mortem examination, the abdomen was found to be almost filled with soft friable tissue of malignant nature. The original ovarian cyst was of a malignant nature and had by its rupture induced a general sarcomatosis of the peritoneum. The author gives a summary of reported cases of malignant ovarian tumors in girls. The great difficulty in distinguishing between the benign and malignant ovarian new growths is pointed out from the clinical aspect; the symptoms in the early stages of each are identical.

The case illustrates well the danger of secondary implantation in rupture of a malignant cyst.

Hereditary Syphilis.—Sharp (Arch. of Pediatrics, 1905, vol. xxii., p. 181). The author draws attention to the lesions of the upper air-passages due to hereditary syphilis. In his experience not 2 per cent. of children with congenital syphilis show Hutchinson's teeth. Clinical evidence may be limited to a roughened, corrugated condition of the tongue, and patches suggestive of leucoplakia. He reports cases of fistula of the trachea of two years' standing in a girl aged 10 years; post-pharyngeal abscess, which he regards as often syphilitic; perforation of the soft palate in a baby, aged 3 months; ulceration of the larynx in a boy, aged 12 years; gumma of the interarytenoid commissure and ulceration of the left arytenoid cartilage in a girl, aged 12 years; and gumma of the trachea in a boy, aged 5 years. Cases of this kind may occur without the presence of the classical symptoms due to hereditary syphilis, such as Hutchinson's teeth, keratitis, and flattening of the bridge of the nose.

The Diagnosis of Mumps by Catheterization of Steno's Duct.—Sicard and Dopfer (La Clin. Infant., May 15, 1905). The authors communicate their researches to the Soc. de Biologie on the cytology of the parotid secretion. This fluid, which is normally free from any histological elements, becomes, in the course of mumps, full of polynuclear lymphocytes, large mononuclear, and some cells peculiar to the salivary gland. Thus catheterization of Steno's duct may give information in abnormal forms of this disease and in orchitis. These observations seem to show that the virus of mumps strikes the glandular system more in the fashion of a poison than by the direct attack of microbial agents. The parotid eliminates the poison of mumps in the same manner as it eliminates—while becoming swollen—other toxic materials such as mercury, lead, and iodine. This method is capable of forming the basis of a true cyto-diagnosis between mumps and other forms of parotitis. A negative cytology does not enable us to deny the existence of any previous glandular reaction, but a positive cytology is a witness to the inflammatory and desquamative process, of which the parotid is a seat.

On the Diagnostic and Prognostic Value of Hemato-Cytology in Infantile Tuberculosis.—Olivi (Riv. di Clin. Pediat., December, 1904). Olivi, from the examination of a large number of children in the clinic at Bologna, comes to the following conclusions: (1) There is an almost constant increase of polynuclear neutrophiles in all cases of diffuse tuberculosis, and in severe local peritonitis and meningitis. (2) There is increase of lymphocytes when the tuberculous process invades the lymphatic system and spleen. (3) The percentage of polynuclear neutrophiles and lymphocytes is almost always very nearly unaltered in tracheo-bronchial adenitis and in tuberculous pleurisy. (4) There is an almost constant and marked decrease of eosinophiles in every case of tuberculosis, whether acute or chronic, localized or diffuse. (5) On the other hand, there is an increase of eosinophiles in those cases of localized tuberculosis should the blood be examined when the local process is undergoing resolution. (6) There is a slight increase of eosinophiles in tuberculous patients who are taking preparations of iodine. (7) Under treatment with tuberculin there is a marked decrease of eosinophiles during the febrile period, and on the other hand, striking eosinophilia when defervescence occurs. (8) In all acute infective diseases there is always an increase of polynuclear neutrophiles and decrease or absence of eosinophiles, but when resolution takes place there is marked eosinophilia. (9) There is marked increase of lymphocytes in rickets with enlarged spleen, and in whooping-cough.

Underdevelopment in Children (Hypotrophie Infantile).—Variot (La Clin. Infant., May 15, 1905). Variot considers this condition often the sequence of infantile marasmus and of capital importance, and not thoroughly studied. Three scientific methods are of service: (1) the body weight; (2) the height; (3) radiography of the skeleton which affords information: (i) of diminished size of the osseous segments; (ii) that the diaphyses are more spongy, less calcified than normal; (iii) that the points of ossification in the epiphysial cartilages are slow in appearing. Premature children are normally underdeveloped. Tuberculosis, alcoholism on the part of the parents, congenital syphilis, congenital malformation, cardiopathies, achondroplasia, athyroidia are causes of special underdevelopment, but the two most common factors are gastro-enteritis and tuberculosis, which latter is rarely the cause of atrophy in very early infancy, but is later in making its appearance, is accompanied by rise of temperature and respiratory troubles, and no gain of weight is obtained whatever diet be administered. The gastro-intestinal form, on the other hand, appears early, is apyretic, and suitable diet is attended with rise in weight. Variot deprecates the use of tuberculin in these cases.

Albuminuria of Childhood.—LANGSTEIN (Versammlung Deutscher Naturforscher und Aerzte in Breslau, 76). The albumin-quotients, *i. e.*, the relations of euglobulin, pseudoglobin, and albumin show very regular variations in the cyclical albuminuria of acute and chronic nephritis of infants. There are three types of cases to be observed: (1) those in which only so-called euglobulin is excreted; (2) those in which both this and albumin are found; (3) cases in which all three albumin bodies are excreted in certain though not constant proportion. Influenced by the results of his investigations on the metabolism in cases of cyclical albuminuria Langstein considers this disease a constitutional disorder. The kidney lesion, the immediate cause of the excretion of the albumin, depends on vasomotor influences; he suggests that in cyclical albuminuria this albumin-compound may circulate in increased quantity in the blood and be derived from the same source as the increased uric and oxalic acids. The albuminuria of the newborn resembles cyclical albuminuria in the nature of the excreted albumins. In the discussion following this paper Hochsinger expresses his belief that the infectious diseases are etiologically of great importance, and cannot see his way to repudiate all connection with degenerative processes in the kidneys. Pfaunder maintains that cyclical albuminuria has a definite relationship to tuberculosis. Many children show later evidence of tuberculous affections and very often succumb to them.

Congenital "Thymic" Stridor of Infants.—HOCHSINGER (Revue Mensuelle des Maladies de l'Enfance, March, 1905, p. 97.) Hochsinger reports a series of 58 radiographs of the thymus in nursing infants; in 26 hypertrophy of the thymus was present, and 20 of these showed the typical picture of congenital stridor. He considers that congenital stridor is due almost exclusively to compression of the trachea by a hypertrophied thymus. Other forms of noisy breathing occur, due to adenoids, enlarged glands, macroglossia, paralysis of the palate and laryngitis: but the peculiar bruit accentuated at the end of inspiration—congenital or appearing soon after birth, with retraction of the thoracic walls, but without the phenomena of laryngeal stenosis and without alteration of the voice—this can only be caused by compression of the trachea by an enlarged thymus. The site of the compression is always at the upper opening of the thorax. The diagnosis is made by skiagraphy and by percussion.

A Case of Status Lymphaticus.—Musser and Ullom (Transactions of the College of Physicians of Philadelphia, Vol. xxvi., p. 47, 1904). The authors report a case in a boy aged 5 years 11 months, well nourished and large for his age. Illness commenced by hoarseness which lasted through the night, and next day the temperature was 100 degrees F. The following night there was rattling and bubbling in the throat, followed by cyanosis in the face and hands, with short, rapid breathing. His voice was hoarse. The next day his temperature was 102 degrees F., with respirations 50, and great restlessness. His voice was at times hoarse, at others perfectly clear. At this time he was very dyspneic, cyanosed face and hands, at times pupils dilated, but waxy pallor of the hands and face was most apparent. Bubbling and rattling in the throat and chest. Retraction of the interspaces and epigastrium with labored inspiration and expiration. Considerable movements of the larynx. Pharynx and larynx congested. No enlarged thymus to percussion. His condition grew progressively worse, he developed a slight convulsion, and then became entirely oblivious to his surroundings, although until then he had spoken to those about him and recognized them. The convulsions continued at short intervals. At mid-day the temperature in the axilla was 105.6 degrees F., and he died peacefully some two and a half hours after. The urine was loaded with albumin, but there were no casts. Post mortem a little turbid yellowish fluid in the right pleura; a few delicate fibrinous adhesions. Superior mediastinum almost entirely filled by the thymus. The general appearance is, of three lobes: a middle lobe which lies just below the sternal ends of the clavicles and reaches almost from one clavicle to the other. What appear as the lateral lobes extend down into the mediastinal fat between the pleura and pericardium. These lateral lobes are more or less fused above the pericardium, but as they descend they separate and apparently extend far down between the pericardial sac and the lungs. Lower down the phrenic nerve is in intimate connection with the gland on both sides. The left lung shows purplish-blue, sharply defined, raised areas of consolidation in the posterior portion, most extensive in the lower lobe. Scattered everywhere through the consolidation are grey or yellowish points, some of them exuding drops of yellow pus. The smaller bronchi in these areas contain drops of pus. The bronchi at the root are deeply congested and contain a thick, yellow, muco-purulent material, most plentiful in the smaller ramifications. The right lung shows purple consolidation of the lower lobe and irregular areas of deep purple consolidation in the upper and middle lobes, studded with minute yellow points. The smaller bronchi are entirely plugged by thick yellowish pus, and the bronchi at the root are deeply congested and contain a small amount of the same material. Epiglottis is edematous and deeply congested, covered by mucus and a soft yellowish purulent material. Larynx deeply congested and very edematous, and covered by small flakes of muco-purulent material. The trachea shows the same condition as the larynx and epiglottis, and this extends down into the bronchi. The thymus weighs 4 grammes. On section it is of a pale pinkish-grey color, dotted with minute opaque yellow points. Attached to the lower border of the left lobe of the thyroid is a smooth rounded mass measuring 2 centimetres in diameter. On careful dissection this does not appear to be in direct connection with the thyroid gland. On section the cut surface is rather firm, and has a slightly yellowish-grey color, being somewhat translucent. It is dotted with minute points, opaque, and of yellowish hue. The spleen is of medium size with soft pulp of a dirty red color, with here and there small hemorrhagic points. Liver, on section, oozes much blood, the lobules fairly well marked with deep red centres. Kidneys: on section medullary pyramids are pale about the papillæ, but deeply injected about the peripheral zone; cortex, greyish red and cloudy; glomeruli injected. Anatomical diagnosis: acute muco-purulent laryngitis, tracheitis, and bronchitis; acute diffuse broncho-pneumonia; hypertrophy of thymus gland. Congestion of liver and kidneys; acute splenic tumor and cloudy swelling of viscera. The heart showed fragmentation, absence of cross striation of fibres, and marked granulation of muscle-cells. From lung and mucous membrane of larynx, Staphylococcus pyogenes aureus. No other organisms. Cover slips from larynx and lungs showed only cocci in groups. No other bacteria. No growth of bacteria was obtained from heart, spleen, liver, kidney, or thymus gland. The authors are of opinion that the case reported is one of status lymphaticus. The one thing lacking is the focal necrosis and marked hyperplasia of the germinal centres in the thymus, but they suggest that this can be overlooked when there is marked enlargement of the thymus, and the changes in spleen, cervical and bronchial glands are identical with those found in other cases. In the diagnosis dyspnea, dulness over the manubrium and enlargement of the superficial lymph glands are the factors on which diagnosis is based. The authors discuss the cause of death, and review the modern theories, viz., pressure by the thymus and toxemia induced by the thymus or lymphatic apparatus. That the thymus can cause pressure on the trachea, although there was no evidence of this in their case, is borne out by the relief obtained from tracheotomy in the cases reported by Koenig and Purrucker in infants of 3 weeks and 3½ months old; and Lange has reported a case where one diameter of the trachea was only one-third that of the other in sequence to pressure. Lochte's experiments on hyperthymization of the blood, and Flexner's experiments with mydatoxins and cytotoxins and the induction of hyperplasia with focal necrosis of the germinal centres are aluded to. As to what causes the sudden accession of toxic material in the blood, they are unable to make a suggestion. In their case toxemia was the cause of death, and for that there were two possible sources: one the infection, and the other the toxin the product of the lymphatic system, and after Lochte's experiments the plausibility of a theory of an auto-intoxication with its source resident in the lymphatic apparatus cannot be denied, in fact clinical experience shows that the type of infection from which the child suffered could not have produced such toxemia in a few hours. Longcope found that in chronic Bright's disease and cirrhosis of the liver there is a decrease in the serum complement or alexin in the blood, and this fact permits of an easy infection, in most cases a terminal one. The lowered resistance due to the thymus may have permitted the infection to kill more quickly than it otherwise would. Solis Cohen, in the discussion that followed, alluded to the symptomatic antagonism of adrenal and thyroid to thymus, and said that he should certainly use adrenal, and should think of thyroid in any case of thymic asthma he might be called to; and Musser remarked that should he see a similar case to the one reported he would want to have some surgical means resorted to, failing relief from Cohen's suggested remedies.

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ORIGINAL ARTICLES

INFANTILE SCURVY*

By W. S. Colman, M.D., F.R.C.P.

Infantile scurvy is a disease of modern times, and is attributable to altered conditions arising from over-civilization, and from the crowding into cities, which makes it difficult or impossible for all children to be fed in an ideal manner. There has been a steady diminution, during the last half century, in the number of children, who are fed in the natural mammalian fashion—at the mother's breast. Some mothers are unable, others unwilling, to suckle their children for a sufficient time, or even at all. Vicarious suckling by a wet-nurse is rarely practicable, and the services of the cow have to be commandeered to supply the human deficiency. Cow's milk, however, is, in cities, rarely taken by the infant immediately after it is drawn from the cow. It has to be brought long distances, consuming much time, and, during its transit and storage, it has been exposed to contamination, and hence precautions, such as scalding, pasteurization, or sterilization by prolonged boiling, are adopted to prevent or check decomposition. However necessary such steps may be in the circumstances, it must be borne in mind that they do slightly alter the character of the milk, as is evident, for example, to the palate. Again, to render milk less bulky, and so more convenient for storage, and also to ensure its keeping, it is "condensed" by evaporating it to a syrup at a low temperature, and here, again, the palate can detect that a change has occurred. But often the modification is greater still. The milk is completely desiccated, and mixed with carbohydrates, and put on the market as one of the proprietary infants' foods. Yet, again, fresh milk is often peptonized, and some of the proprietary dry foods are predigested in the process of manufacture. The advantages and drawbacks of these various methods of dealing with milk are discussed in another article; this introduction is intended to emphasize the fact, that numbers of children, rich as well as poor, during a period when they should be having "living" milk, are getting milk which has undergone considerable change since leaving the cow. As a result of this frequency of artificial feeding, scurvy has appeared among children, and although cases are by no means common, they are steadily on the increase.

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*Practitioner.

It is less than thirty years ago, since the nature of the disease was recognized by Cheadle, although isolated cases had been published under such titles as "Periosteal Cachexia," "Hemorrhagic Periosteitis," &c. Cheadle's paper on "Three Cases of Scurvy Supervening on Rickets in Young Children" appeared in the *Lancet,* November, 1878. He published other cases, and again insisted on their identity with adult scurvy, in the same journal in July, 1882. But his views were somewhat slow in gaining general acceptance, and the cases were regarded as exceptional forms of rickets; and they were described, especially in Germany, as "Acute Rickets." The true state of affairs was demonstrated in a masterly paper, read by Sir Thomas Barlow before the Royal Medical and Chirurgical Society, entitled: "On Cases described as Acute Rickets, which are probably a combination of Scurvy and Rickets, the Scurvy being an essential, and the Rickets a variable, element." In the paper, the clinical and post-mortem characters of the disease were so thoroughly and accurately worked out that little has been added by subsequent observes. The truth of Cheadle's contention was thoroughly established, and Barlow's paper will always be a classic in clinical medicine. In France and Germany the condition is generally known as "Barlow's Disease." Owing to the frequency with which the disease is found in children suffering from rickets, the condition is still often described as "scurvy rickets." But, as Barlow showed, the scorbutic symptoms are quite independent of rickets, and rickets may be entirely absent. It is no more appropriate to speak of "bronchitis-rickets," and it is better to employ the term Infantile Scurvy.

Onset of Symptoms.—Although the full manifestations often appear suddenly, it can usually be elicited, from the parents, that the health of the child has been unsatisfactory for some time, and that such warning signs as anemia, restlessness and fretfulness when handled, have been present. Then, often suddenly, painful swellings appear in connection with the long bones, causing acute suffering; so suddenly, indeed, that suspicions of falls or injury are entertained, and the nursemaid may be packed off in disgrace. For instance, in one case seen by the writer, the child was in splints for supposed traumatic fracture of the humerus, and in another the child had, for a fortnight, endured unnecessary suffering from splints for a supposed injury to the femur. In both instances it was assumed that the baby must have been dropped, or roughly handled, by the nurse.

General Appearance.— The infant, usually between 10 and 18 months old, is well nourished but pale, and usually has a peculiar sallow "earthy" cachectic appearance. He may be lying quietly, without any appearance of suffering, but on the approach of anyone, he screams with apprehension, and, if handled in any way, gives peculiarly piercing shrieks of pain. When uncovered, he is found to be lying on his back, with the thighs everted, and the knees slightly bent. Instead of kicking and struggling, as a screaming baby usually does when it resents handling, it is at once apparent that the legs are not moved, and this immobility is often so complete as to lead to a diagnosis of infantile paralysis.

Hemorrhagic Lesions in Connection with Bones. — These are by far most frequent in the lower limbs. Swellings can be seen over the lower end of the femur on one or both sides or at one end of the shaft of either tibia or fibula. The skin over these swellings may be tense and glossy, but heat and redness are almost invariably absent. They are acutely tender and rather boggy on palpation. Occasionally, on gentle movement, soft crepitus can be elicited from fracture in the neighborhood of the epiphyseal line. When this occurs at the lower end of the femur, the knee joint may be found filled with blood, but spontaneous hemorrhage into joints is very rare in infantile scurvy, apart from fracture. Similar hemorrhagic swellings also occur over the humerus, usually at the surgical neck, and even where there is no actual hemorrhage, the bones of the upper limbs are very tender when handled. Periosteal hemorrhage has been found, post-mortem, on the blade of the scapula, but, in the only case I have seen, no swelling was detected during life. Another occasional site for hemorrhage is over the costochondral junction. In one such case, numerous fractures had occurred at the sternal end of the ribs, so that the sternum and cartilages receded into the thorax, the appearance resembling that when the body has been sewn up after an autopsy. One or two cases have been recorded in which there was hemorrhage from the inner surface of the dura mater.

Hemorrhagic Lesions in the Guma.—This is only seen fully developed after the teeth have been cut, and, as a rule, the more teeth there are, the more severe is the sponginess of the gums. The gums at first may be only slightly swollen around the base of the tooth, and are of a deep purple color from the extravasated blood. The swelling rapidly increases, and may be so great as to hide the teeth from view. These swollen gums ulcerate and slough, giving rise to horrible fetor. The swallowing of this septic material greatly aggravates the anemia. When the teeth have not yet been erupted, the gums may present a perfectly healthy appearance, but often there is some ecchymosis over the oncoming incisors, and where the incisors have already been cut, similar ecchymosis may be seen over the site of the future premolars. This condition of spongy gums is rarely entirely absent if the teeth are through, and is of the greatest help in forming a diagnosis.

Cutaneous and Subcutaneous Hemorrhage.—Petechiæ and bruises may be met with, but much more rarely than in adult scurvy. More frequently hemorrhage occurs into the orbital tissues, giving rise to proptosis, and, after a day or two, to discoloration of the lower eyelid. In one slight case, which came under my observation, hemorrhage into the nymphæ and bone tenderness were the only symptoms.

Changes in the Urine.—Hematuria is frequently met with. It is rarely severe, but increases the anemia. The urine is difficult to obtain in bulk in infants, but in two cases there was an extraordinary number of catarrhal cells, making the urine turbid, the condition rapidly disappearing as the other scorbutic symptoms cleared up. Epistaxis and hemorrhage from the bowel are not uncommon. Hemoptysis has not been observed.

Other Symptoms.— Unless the condition of the mouth is very septic, there is usually not much pyrexia. The temperature may even be subnormal, and rarely reaches 101° F. In fatal cases, hyperpyrexia may occur a few hours before death, but this must be regarded as a symptom of dissolution rather than scurvy. Examination of the blood shows the changes of secondary anemia. The number of blood cells is diminished, and there is marked deficiency of hemoglobin. There is no leucocyte change. As Ralfe long ago showed, the alkalinity of the plasma is much reduced.

Slight Cases.—In the early stage, as has been already mentioned, the symptoms are much slighter; and cases are also met with in artificially fed children, where there is little to be noticed except anemia, bone tenderness, and some redness of the gums round the teeth. Whenever a child suffers from bone tenderness, especially if it is rickety, the possibility of scurvy should be borne in mind and the diet rectified accordingly.

MORBID ANATOMY OF THE BONE LESIONS.

On examining the affected limbs, it is usually found that there is some hemorrhage into and between the muscles, though to a less extent than in adults. The main changes are found in connection with the periosteum and shaft of the bone. These are most conveniently demonstrated in a vertical section. (1) The periosteum is found to be raised from the bone by an effusion of blood which, at the time of the post-mortem examination, may be discolored. The periosteal membrane itself is swollen and infiltrated with blood, but a section, examined under the microscope, shows little inflammatory reaction. The periosteum is usually only raised over one end of the shaft, but occasionally the whole shaft is found to be bare. New bone is hardly ever formed in the elevated periosteum, and, in the very few instances, in which this has been observed to occur, the amount was small, and the new bone showed scarcely any calcification. (2) The shaft, although denuded of periosteum over a considerable area, rarely undergoes necrosis. Its nutrition is impaired, and fractures are not infrequent, taking place a little distance from the epiphyseal line. (3) The medulla shows speckled hemorrhages in the neighborhood of the periosteal hemorrhages, and sometimes the medullary cavity is filled with blood. Rarefaction of the cancellous tissue is often seen, but is due to associated rickets rather than to scurvy.

Diagnosis.—In a well-marked case, the combination of spongy gums, bone tenderness and local swellings make the diagnosis easy. In cases where the gums are unaffected, there is often considerable difficulty. The immobility may suggest either infantile paralysis, or epiphysitis due to congenital syphilis. The latter however, hardly ever occurs as late as six months, while scurvy is seldom ever seen before that age. The high degree of tenderness in scurvy and the local swellings usually enable it to be distinguished from infantile paralysis, in which muscular tenderness is seldom acute. From injury, the diagnosis is often very difficult, especially if there is a fracture. In the absence of sponginess of the gums, the chief differential point is, that in scurvy there is usually marked tenderness of the long bones. The difficulty is that, with a screaming, terrified child, it is very hard to be sure about the presence or absence of tenderness. Lastly, the site and tenderness of the swellings may strongly suggest acute necrosis. This condition, however, is usually accompanied with high pyrexia, while, in scurvy, the rise of temperature is slight, and there is no local heat on palpation.

The cases, which are most easily missed, are the slight cases, where there is only hematuria or epistaxis. Usually careful examination of the gums will reveal the true nature of the hemorrhagic affection.

Course of the Disease.—If the diet is corrected, as advised in the section on treatment, the symptoms almost always subside with the most striking rapidity. In less than 24 hours, the acuteness of the pain and tenderness will pass off, and the swellings will have become less tense. In a few days more, the blood will have been absorbed, though some periosteal thickening can be detected for some weeks. If fractures have occurred they usually unite with great rapidity, and with little formation of callus. If, however, the diet is not rectified, the anemia and cachexia increase, and, in a severe case, the child may die from exhaustion or from some intercurrent disease, such as bronchopneumonia. In the milder cases, spontaneous improvement does occasionally take place, probably through the parent "tempting" the child by a more varied diet, but it is usually very slow. As regards any ultimate effect, the children grow up quite strong and healthy, although associated rickets may require treatment for some time.

Etiology.—The lesions, occuring in infantile scurvy, present no essential difference from those in the adult form, and there is general agreement that we are dealing with the same disease. Scurvy formerly broke out, whenever fresh food was unobtainable, as, for instance, on long voyages, during sieges, during winter in Arctic regions, among armies, when they were stationary, and all local supplies of fresh green food had been used up. It has also broken out in recent times in camps of coolies employed in outlying places; e. g., building bridges in Central Africa, when the food provided has not included fresh vegetables and fruit. It has been shown by Nansen and others that, even when fresh vegetables are not available, scurvy can be prevented by taking abundance of fresh meat. It has also long been known that outbreaks of scurvy could be at once stamped out, and that the sufferers would promptly recover as soon as fresh vegetables, meat or fruit could be supplied, as when a siege was raised, or when the onset of spring awakened vegetation. Sub-acid fruits, potatoes, green vegetables, and fresh meat have special value. Since absence of fresh food promotes, and its provision cures, scurvy, we speak of it as having "anti-scorbutic" properties. Patient chemical investigation has failed to detect any body present in the vegetables and fruit, which, by experience, are found to be most anti-scorbutic, nor has any substitute for fresh animal and vegetable food (or their juices) been found which will cure scurvy. The nature of the anti-scorbutic property is still a mystery, and we are not yet in a position to state positively whether it is some "vital" property outside of our present methods of investigation, or some definite chemical body. It is probable, however, that, in addition to this negative factor, there is also a positive one, viz., some toxic effect of the food taken. For it must be remembered that, during outbreaks of scurvy, there has not only been privation so far as fresh food is concerned, but the food which was procurable during sieges, on shipboard, &c., was of poor quality and also unwholesome. During the recent Antartic expedition, scurvy was successfully kept off for a long time. But the preservation of the tinned food was defective, and as soon as they had come to the end of what was sweet, and had to use some that was tainted, scurvy broke out. Indirect evidence that there is some toxic factor required, as well as the negative one, is supplied by the curious fact, pointed out by Osler, that, in cases of starvation due to privation, to disease, or to fasting for public exhibition, scurvy does not occur.

In infantile scurvy there are also the same two factors—(a) absence of a sufficiency of fresh milk (often none at all), (b) the use of food which has undergone considerable alteration. So far as I know, scurvy has never been observed in an infant that was entirely breast-fed, except during sieges when the mother was herself suffering from scurvy. Nor does it occur in children, fed entirely on fresh unboiled milk, although, as Cheadle points out, the anti-scorbutic power of milk is low, and large quantities are necessary to protect the child. But it does occur, and sometimes severely, when the diet consists of only a small amount of unaltered milk, together with some preserved "patent" food. Indeed, in infants, the second factor, toxic effects of alteration in the food, seems to play a larger part than in adults.

Patients with infantile scurvy have generally been fed on sterilized milk, peptonized milk, or some of the dried proprietary foods. Condensed milk, unless infants' food is given as well, has not caused it in any case I have seen. And I have only seen it once, and then in the mildest form, where the child was fed entirely on pasteurized milk. A short time ago, there was an epidemic of infantile scurvy among children in Berlin, supplied with pasteurized milk from an institution; but it was found to be confined to children, whose parents, as an additional precaution, boiled the pasteurized milk for some time after it was delivered to the house. Out of 25 severe cases seen in hospital and private practice, 19 patients were taking some kind of dried infants' food as their staple diet (seven having a certain amount of fresh milk as well). The remaining six were taking sterilized, or humanized milk, or milk sterilized by prolonged heating. In his "Lectures on the Practice of Medicine" (Smith, Elder & Co., 1900), Cheadle gives full details of the previous feeding in 60 cases of infantile scurvy observed by him. Of these, 46 were taking various patent foods (13 of them taking a certain amount of milk said to be fresh at the same time), and among the remainder, three were taking peptonized, and seven sterilized, or humanized milk. It is clear that, without artificial feeding, we should have no scurvy, but it is also true, that it is only a small proportion of artificially fed babies, that develop scorbutic symptoms. What the predisposing causes, in this minority, may be we have at present no knowledge. At one time it was suggested that syphilis was a predisposing factor, but this has been disproved. Nor does it appear that rickets has any effect in determining the outbreak of scurvy, for all rachitic symptoms may be absent, and the frequent association of rickets and scurvy seems to be due to a common cause —unwise dieting. The fact remains, that, when a child is artificially fed, there is risk of scurvy, and this can be satisfactorily obviated by supplying the child with milk as little altered as possible after it is drawn from the mamma of the animal supplying it.

Treatment.—The treatment is simple. (1) Stop all food which is not absolutely fresh. (2) Give the child abundance of fresh food. The appetite is usually very good, and unless the mouth is very sore, the child will take such food freely. *Unboiled* milk, orange or lemon juice, suitably sweetened, fresh cream, raw meat juice, are the best to employ. Potato soup, made by sieving a potato cooked in its jacket and pouring over it a breakfast cup full of boiling milk, slightly sweetened, may also be given, if the child is over 10 months old. The limbs should be steadied either by sand-bags, or by loosely encasing them with sheet lead. Firm bandages and splints should be avoided. Weak peroxide of hydrogen lotion is a useful application for the stomatitis. A few doses of opium are occasionally necessary, if the pain is very acute but the rapid improvement, if proper diet is provided, renders sedatives unnecessary in the great majority of cases. As a rule no drugs are required. But it must be repeated that rapid improvement is not to be looked for, unless all preserved foods are omitted from the diet. The writer has seen three cases, in which, although fresh milk, raw beef juice, and orange juice were freely administered, the pains did not subside until the patent food, which had been persisted in, was stopped. As soon as this was done, the subsidence of all scorbutic symptoms was immediate.

· INFANTILE SCORBUTUS[1]

AN ANALYSIS OF FIFTY CASES, INCLUDING TREATMENT.

By John Lovett Morse, A.M., M.D.,

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Infantile scorbutus developed in seven cases under my direct observation. Six cases were brought to my office, nine were seen at the Infants' or Children's Hospitals, and twenty-eight in consultation with other physicians. The true nature of the illness had been recognized in but five of those seen in consultation.

The following diagnoses had been made previously in these cases and in those seen at the office and hospitals: Acute nephritis, 5; tumor of bladder, 1; excess of uric acid with consequent staining, 2; arsenical poisoning with inflammation of the kidneys, 1; rickets, 2; spinal or Pott's disease, 6; hip disease, 1; periosteitis, 1; rheumatism, 6; gout, 1; syphilis of cord, 1; difficult dentition, 5, in four of which the gums had been lanced; strain, 1; injury, 1; tuberculosis, 1; gumma of eye, 1. In two other cases the physicians stated that they had no idea what was the trouble.

It is evident that the errors in diagnosis depended somewhat on the prominence of individual symptoms. It is probable, moreover, that other diagnoses had also been made which were not noted in the records. In speaking of errors in diagnosis in connection with infantile scurvy it is only fair to state that it is also possible to mistake other conditions for this disease. I have mistaken congenital syphilis and hematuria from lead poisoning for scurvy and have known septic arthritis to be mistaken for it.

Sex and Age.—The patients were nearly evenly divided between the two sexes, twenty-three being males and twenty-seven females. The age at the onset of the symptoms varied between three and nineteen months. Thirty-three or 67 per cent. of forty-nine cases with complete data were between six and ten months. Seven were under six months and nine over ten months.

The duration of the symptoms before the patients were seen varied between two days and ten months, in all but six being between one week and three months. The age of the patients when first seen varied between four and twenty-one months, thirty-seven, or 74 per cent., of fifty cases being between seven and twelve months. Four were under seven months and nine over twelve months.

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[1] Jl. A. M. A.

ETIOLOGY.—Table 1 shows the food which were being taken at the time when the symptoms of scurvy developed.

TABLE I.—FOODS DURING THE USE OF WHICH SCURVY DEVELOPED.

PROPRIETARY FOODS:	
With water	8
With milk:	
Irrational mixtures, boiled	9
Irrational mixtures, pasteurized	2
Rational mixtures, unheated, pasteurized	2
Rational mixtures, heated and peptonized	1
Rational mixtures, unheated	3
MILK AND WATER MIXTURES: Irrational:	
Peptonized and boiled	1
Unheated	1
Heat unknown	1
LABORATORY MIXTURES: Too weak:	
Peptonized and pasteurized	1
Pasteurized	1
Rational, pasteurized	4
HOME MODIFICATIONS:	
Irrational, same for four months pasteurized	1
Too weak, same for months, unheated	1
Unheated	2
Rational, boiled	2
Peptonized and pasteurized	2
Barley water, peptonized and pasteurized	2
Barley water, pasteurized	1
Oatmeal water, pasteurized	1
Same for five months, pasteurized	1
Pasteurized	1
Pasteurized and beef juice	1
Barley water, unheated	1
GENERAL DIET at 13 months, but with no fruit or vegetables	1

From the point of view of modern ideas of reasonable infant feeding the food was irrational in nineteen of the cases taking proprietary foods, in four of those taking milk mixtures, and in the case of the infant on a general diet, making a total of twenty-four. Milk was used in the preparation of the food in forty-one cases, while no milk was used in eight cases. One baby was on a general diet. In the forty-one cases in which milk was used in the preparation of the food the mixture was boiled in twelve, pasteurized in nineteen and unheated in nine, while in one case there was no data as to whether or not heat was used. The food was also peptonized in four of the pasteurized and in one of the unpasteurized mixtures. The mixture was manifestly too weak in five cases, and the same mixture was continued for months in two cases. The food was often unsuitable in several ways in a single case. In one case only was a rational unpasteurized mixture being taken, and that was prepared with barley water instead of with water. Bread and crackers in two, egg in one, beef juice in one and a general diet in another case failed to prevent the development of the disease.

Analysis of the foods taken by these cases justifies the conclusions of the committee of the American Pediatric Society that "the development of the disease followed in each case the . . . employment of some diet unsuited to the individual child" and that "the farther a food is removed in character from the natural food of a child the more likely its use is to be followed by the development of scurvy." Analysis of this table also seems to show that the absence of "freshness" and the heating of the food are very important elements in the production of scurvy.

The digestion was good in twenty-three and feeble in twenty-seven of these cases, apparently showing that the scurvy was not due to disturbance of digestion and that foods may cause scurvy without causing disturbances of digestion.

The onset of the scurvy was immediately preceded by measles in one case, influenza in three, broncho-pneumonia in one, and infectious diarrhea in four. It is probable, however, that these diseases had no direct influence on the development of the scurvy unless possibly by weakening the general resistance.

There were signs of rickets in the osseous system in all but nine of these cases. They were slight in twenty-six, moderate in eleven, and marked in four. There was, however, no evident relation between the severity of the rickets and that of the scurvy. It seems rational to conclude, therefore, that the rickets had no influence on the development of the scurvy and that if there was any connection between them it was merely that they were both the results of a common cause.

The only evident cause for the development of the scurvy in these cases, therefore, is found in the food. No further conclusions as to the etiologic connection of the food and the disease than those already stated are, however, justified.

SYMPTOMS.— It seems best to analyze the private cases separately as to the order of the development of the symptoms, as it is possible to get from them a better idea of the onset and course of the disease in its early stages than from those seen after its more complete development. In all of these cases a gradual loss of color preceded for weeks or months any other symptom. This loss of color was often associated with loss of appetite. Tenderness of the back was the next symptom noticed in two, tenderness on handling in three, and hematuria in two cases. The next symptoms which developed were swelling of the gums in one, tenderness on handling in two, and paresis of an extremity in two. The time between the onset of the second and third symptoms varied between one week and two months.

Table 2 shows the comparative frequency of the various symptoms and also the relative order of their appearance.

TABLE 2.—ORDER OF APPEARANCE OF SYMPTOMS.

	First.	Second	Third.	Fourth.	Fifth.	Sixth	Total.	Private. Cases Added.
Tenderness	21	12	2	1	—	—	36	43
Inflamed gums........	10	3	2	—	1	1	17	18
Hematuria	7	1	—	1	—	1	10	12
Paresis	4	9	5	2	—	—	20	22
Pallor	2	2	—	—	—	—	4	11
Swelling	1	2	5	2	3	—	13	13
Ecchymoses	1	—	3	—	2	—	6	6
Hemorrhage: Bowels.	—	—	1	1	—	1	3	3
Mouth..	—	—	—	1	—	—	1	1
Orbit...	—	—	—	1	—	—	1	1

It is noticeable how seldom pallor was noted in these cases. That it was overlooked, however, is shown by the fact that on examination pallor of various degrees was found in thirty-six, or 75 per cent., of forty-eight cases. In five others the color was noted as fair, while in only seven was it good. Examinations of the blood were made in but two cases. They both showed a marked diminution in the hemoglobin and in the number of red corpuscles with a slight leucocytosis, the relative proportions of the white corpuscles being normal. Tenderness was the symptom most commonly noted, while paresis of the extremities comes next, closely followed by inflammation of the gums, swelling of the extremities and hematuria. Tenderness on handling was the first symptom noted in nearly one-half of the cases, swollen or purple gums in about one-quarter, and hematuria in nearly as many.

Fever was never mentioned among the symptoms, but in several of the hospital cases the temperature was slightly elevated, running in one case as high as 103° F. No other causes were found for these temperatures, which diminished steadily with the cure of the scurvy. It is reasonable to conclude, therefore, that the fever was due to the scurvy and not to complications.

There was very great variety in the suddenness of the onset and in the severity of the early symptoms; for example, the gums were swollen for six months in one case, and there was hematuria in another for three months before the appearance of tenderness, while in still another there was tenderness in the legs for two months before there was any swelling. In one case there was a history of a fall, with immediate loss of power and pain in one leg; in another, marked swelling of the leg developed in forty-eight hours after a fall; while in still another a fall on the floor was followed by immediate loss of power in the leg, this in turn being followed in five weeks by inflammation of the gums.

Physical Signs.—Careful analysis of the physical signs found in these cases shows that there must have been many errors in observation regarding the frequency and order of development of the symptoms. This has already been shown in the note regarding pallor.

Twenty-nine infants had teeth and nineteen had no teeth. The gums were normal in six and abnormal in twenty-three of the cases with teeth, while they were normal in seventeen and abnormal in only two of those without teeth. The gums were normal, therefore, in twenty-three and abnormal in twenty-five cases. When there were both upper and lower teeth the upper were involved alone in eight cases, while the lower were never involved alone. The gums were involved about all the teeth in fifteen and about part of the teeth in eight cases. Other portions of the gums besides those about the teeth were involved in eight cases.

One leg only was affected in nine cases; in seven of these it was the right and in two the left leg. Both legs were affected in twenty-five cases. The arms and legs were both affected in eleven cases, but the arms were never affected alone. Pain on motion of the extremities was noted in forty-three cases; that is, in practically all those which were not cases of simple hematuria. There was tenderness on handling in thirty-seven cases. Limitation of passive motions was noted in but ten and paresis in but eight cases. These latter figures are undoubtedly too low because of the failure to record all the observations. Swelling limited to the diaphyses of the bones was present in twenty-seven cases. In one the sternal ends of the clavicles were affected. The arms were affected in ten cases, the swelling being in the upper arm in four and in the lower in six. The legs were affected in thirty-four, the thigh being involved in seventeen, the lower leg in fifteen and the feet in two cases. The swelling sometimes involved the whole, but was more often limited to a portion of the diaphysis. The upper portion of the humerus, the lower of the bones of the forearm and of the femur, and the lower portion or the whole shaft of the tibia were most often involved. The swelling in the feet was always on the back.

The position of the legs was very characteristic in twenty-seven cases, although the completely typical position was not always present. The tendency was always to hold the lower extremity rigidly with the thigh flexed on the abdomen, the leg flexed on the thigh, the foot extended and the whole leg rotated outward.

Pain on motion of the back was noted in five cases. This proportion is undoubtedly too low, partly because of failure to record the point and partly because of the difficulty of determining the presence or absence of pain in the back when there is pain in the legs.

Ecchymoses were present in eleven cases. They were on the legs and feet in five, the eyelid in three, the face in two, the body, chest and abdomen in one each, and all over the body in one. There was also a hemorrhage into the orbit, with consequent protrusion of the eye in one case.

There was edema in eleven cases. It was in the eyelids in two, in the legs and feet in five and in the feet alone in five. This was a true edema of the soft tissues and not an inflammation or hemorrhage under the periosteum.

CASES OF HEMATURIA.—The cases of hematuria form such a characteristic and peculiar group that they seem worthy of separate consideration. The urine was normal in twenty and abnormal in fifteen cases. In three of these, however, it was merely noted that the urine stained the diapers red or brown. There were no data as to the urine in fifteen cases. Barring pallor in two of the private cases, hematuria was the first symptom noted in eight of the proved cases of hematuria. It was the only symptom of scurvy in two and in the rest preceded the other symptoms by one-half, one-half, three and one-half, four, five and one-half, and nine weeks respectively. The urine was usually red, but was sometimes brown. The blood was both normal and abnormal, but usually normal. It was often present in large amounts. The amount of albumin corresponded to the amount of blood, which was often large enough to give an alkaline reaction. Hyalin and fine granular casts and an excess of cells were found occasionally; brown granular and blood casts were also found in one instance. In one of my own cases the true nature of the hematuria was not recognized until tenderness developed, while in the other it was recognized at once. In the other cases the diagnoses, based on the hematuria, were acute nephritis in five, tumor of the bladder in one, uric acid staining in one, and arsenical poisoning in one. The response to treatment was rapid and the urine became normal in all. There was marked improvement in the hematuria in one day in two cases. The urine was clear in five days in two, in ten days in two and in fourteen days in two cases. There were no accurate data as to the duration in the other six cases.

It is evident from these figures that the earliest symptom of scurvy is, as a rule, loss of color, which is often associated with loss of appetite. The first symptom to attract attention and to justify the diagnosis of scurvy is most often tenderness or pain in the legs or back on handling. Swollen and purple gums or hematuria may, however, precede the tenderness and pain. Tenderness and pain on motion of the extremities almost always develop sooner or later, and in about half of the cases are accompanied by swelling about the diaphyses. The legs are affected about three times as frequently as the arms. The gums are affected in about half of the cases; almost always when there are teeth, very rarely when there are no teeth. Hemorrhages, except under the periosteum, are comparatively uncommon.

The order in which the symptoms develop and the intervals at which they make their appearance vary materially. The onset may be very sudden or very insidious. Mild symptoms may persist in some cases for weeks and even months before the development of others, while in other cases several symptoms may appear together or in rapid succession, the typical picture of the disease being developed in a few days.

TREATMENT.—Recovery from the scurvy occurred in all cases, although a few died later from coincident diseases.

The food was not changed in fifteen cases. The foods are given in Table 3.

TABLE 3.

Laboratory milk, pasteurized	2
Home modification, unpasteurized	2
Home modification, pasteurized	6
Proprietary foods with fresh milk	2
Proprietary foods with heated milk	2
Proprietary foods with water	1

In all the other cases the food was changed, the attempt being made in every case to give not only a more rational food, but one more suitable for the individual baby. Proprietary food mixtures were changed to milk mixtures and milk mixtures to better milk mixtures. Sterilization was always stopped and pasteurization was stopped if the milk supply and time of year permitted. Peptonization was stopped in every case. In fact, the food was made rational as to its chemical composition, and everything tending to destroy "freshness" as far as was possible omitted.

One patient was given lemon juice. All the others were given orange juice, except two that were given beef juice. Eight others also took beef juice in addition to the orange juice. One who was given beef juice alone took two tablespoonfuls daily while the milk was changed. The amount given in the other case is not known and the milk was not changed. Both recovered rapidly. As has already been mentioned, scurvy developed in one who was taking one ounce of beef juice daily.

The amount of orange juice given varied considerably. Seven patients took one tablespoonful daily; twenty, two tablespoonfuls; and one, four tablespoonfuls. Four took the juice of half an orange, and seven the juice of a whole orange daily. The amount is not stated in seven. In one case in which there was no result from ten drops of lemon juice given three times daily for a week, recovery was very rapid on the juice of half on orange daily. In another case there was no improvement noted in two days while taking one tablespoonful of orange juice daily, but when the amount was increased improvement was very rapid. It seems safe, therefore, to conclude that at least one tablespoonful of orange juice is necessary daily, and that two tablespoonfuls, or the juice of half an orange, is amply sufficient to bring about a rapid cure.

Pain and tenderness were usually the first symptoms to yield to treatment and were soon followed by the return of power in the extremities. Improvement in the condition of the gums usually began later and progressed more slowly. The disappearance of the swelling was, as would be expected, always slow. Marked improvement in the swelling, even if it was extreme, was always noticeable in a week. The protrusion of the eye was gone in six days.

An analysis of the results of the treatment in these cases shows that the mildest cases were well in two days, and that many cases were entirely well in five days. Almost all showed marked improvement in three or four days. Pain and tenderness were always gone in one week, while the gums were rarely normal before one or two weeks. Most cases were well, except for the remains of swelling and hemorrhages, in two weeks, while recovery was always complete in three weeks.

How soon the improvement may begin and how rapid it may be is shown by the following extracts from letters written by the parents of some of these patients: "Immediate improvement;" "better in twenty-four hours, kicking in forty-eight hours;" "different baby in a week;" "progress simply marvelous;" "immediate response to treatment;" "improvement before taking the juice of a whole orange."

THE TREATMENT OF ENURESIS AND POLYURIA BY EPIDURAL INJECTIONS.[1]

By W. T. Freeman, M.D., Dur., F.R.C.S. England.

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The treatment of enuresis and polyuria, both in children and adults, has long been, and is still very often, a difficult thing to carry out with permanently good results. Some authorities condemn all giving of drugs as useless procedure; others praise certain remedies, which are announced as specifics if persevered with. Cantharides, strychnine, the bromides, belladonna, hyoscyamus, and ergot are probably the remedies most often given by the mouth, and if the patient be neurotic, with a neurotic family history, nerve sedatives, such as the mixed bromides, pushed gradually to the extreme limit of dosage, often seem to produce good results. I have had little experience of mechanical treatment applied directly to the neck of the bladder, such as massage by the finger through the rectum, or the passing of a cold sound. Occasionally such treatment appears to have good results, but the procedure in either case is hardly the one to recommend in the case of girls from nine to twenty years of age, and it is at these ages amongst females, that the disease causes peculiar distress. Removal of the clitoris is a barbarous operation, but in one or two recorded instances, where there has been a permanent erection of this organ, the operation has been justified by the results.

Now we come to consider the particular method of treatment which forms the subject-matter of this paper. It is that of epidural injections into the sacral canal, and one which I have been carrying out at the Royal Berkshire Hospital and elsewhere for some months past.

We mean by this, injecting fluids into the space that lies between the periosteum of the vertebræ and the membranes of the cord. There is plenty of room here once you are into the canal, but in the case of quite young children the aperture of admission is small and by no means always easy to find. From the age of nine years and upwards the little operation involved is comparatively easy, and in the older patients can be carried out without the aid of an anesthetic, but in the younger ones my experience proves to me that the administration of nitrous oxide or ethyl chloride to complete anesthesia is an absolute necessity.

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[1] Brit. Jour. Chn'c. Dis.

The value of such injections was at first accidentally discovered and was for a time carried out under the name of lumbar puncture, and the fluids were injected subdurally, not epidurally. Then it was noted that the fluid seemed to act, not so much upon the spinal cord as upon the nerve-roots of the cauda equina. Acting upon this, Cathelin, a French physician, made experiments by which he proved that he could make injections epidurally and produce as sound results as when they were made subdurally. Thus the operation was simplified and the risk to the spinal cord minimized.

We have to remember, then, that the injections are to be made epidurally and with the object of stimulating the nerve-roots of the cauda equina. As to the *rationale* of stimulating these nerve-roots, the stimulating effects are believed to spread up to the lumbar controlling center and reflexly to excite its corpuscular elements, and thereby to produce inhibitory changes. The proper functions of the center in a fair proportion of cases seem to be permanently affected, and the tone of the enervated sphincter to be permanently improved.

In the smaller proportion of cases only partially good results are obtained, and in some cases, perhaps as many as one in eight, the treatment is a total failure.

At first specially prepared fluids were used, but the actual composition does not matter, and normal saline solution is as good as anything for the purpose. Normal saline solution, by the way, injected hypodermically, produces an anesthetic effect upon the skin. It should be used in large quantities, and as much as two to five or six drachms may be injected upon each occasion, and in obstinate cases ten to twelve drachms may be used. The good results are often obtained after a single injection, but it is wise in any case to repeat it after a day or two. If no good results are obtained after the third or fourth injection it is better to consider that the attempts have failed.

It goes without saying that the syringe, needle, skin of the patient, and hands of the physician should be, previously to the operation, carefully sterilized and cleansed.

So far, although my results have not been uniformly successful, nevertheless no harm has been done, and this pretty well coincides with the results obtained by other observers. The treatment has been carried out most extensively in America, to some extent on the Continent, and to a smaller extent in Great Britain.[2]

Now as to the technique of the little operation. The injection may be made in the standing position, but I prefer the patient to be on a couch in the ordinary obstetric position, with the sacrum well thrown out. A large syringe is required: I have always used an all glass serum syringe. The needle should be from 1½ in. to 3 in. long. The landmarks are the sacral cornua and the tip of the coccyx. Work from the tip of the coccyx until on either side of the middle line the sacral cornuæ are definitely made out. The membrane stretching between the cornuæ has to be pierced, and if this can be successfully done the needle runs away as it were into space, and the fluid when the piston is pushed home disappears with the greatest ease. Keep in the middle line, and push home the needle in a direction upwards and forwards—acting thus you either enter the epidural space of the canal or you impinge to your disgust upon the bony sacrum. If you do this, withdraw the needle and push it up again, a little higher or a little lower down. After some experience there is no mistaking the happy feeling of having entered the canal, but—and especially in quite young children—it is very easy to miss the narrow aperture covered in by the membrane. In about one in five or six cases it has been my misfortune to miss altogether the entrance to the space, and this always occurred in quite the youngest children. Both our house physician and myself have upon one or two occasions pushed the needle into the more or less soft structures lying over the sacrum, and this mishap has occurred by not keeping the point of the needle sufficiently pointed forwards as well as upwards, and also not unlikely, looking at the anatomy of the sacrum, by pointing it in a directon out of the middle line.

Sometimes a little triangular depression or pit is found in the skin at the posterior end of the cleft between the buttocks; when this is discoverable it is a great aid as the point at which to insert the needle.

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[2] Editorial: "Epidural Injections in the Treatment of Incontinence of Urine," British Journal of Children's Diseases, December, 1904, p. 551.

If by mistake one gets into the soft (not very soft, by the way) tissues lying over the sacrum the mistake is easily found out, for part only of the fluid is pressed out of the syringe by the piston, and this with difficulty, and moreover the fluid that does get into the tissues distends the skin, and proves at once what has been done.

I recommend no one to lightly undertake this little procedure without at first thoroughly handling the bony sacrum and coccyx and grasping the landmarks, nor do I recommend it to be done without a little practice upon the dead body, followed if possible by what is quite a pretty little dissection. The operation seems so easy, and so it is with a little experience and when the patient is twelve years of age and upwards, but I do not think it is such an easy procedure as some American authorities seem to say it is, anyhow if we are dealing with the younger subjects.

The coccyx in young children is a pearly-looking unossified structure which I have proved might be easily pierced if too powerful efforts were made to push the needle directly forwards, or if the skin was punctured unnecessarily low down.

In spite of this, if in doubt, I think it is best to enter the needle too low down in the cleft of the buttock than too high up—once above the cornual membrane one is helplessly lost, but the point of the needle may find its way upwards to the proper space. although it was entered just below instead of over the entrance.

Having found it frequently a difficult procedure to enter the epidural space of quite the younger patients, I had a needle of a very small calibre made for me, for use in these cases, but I have since discarded it. It was apt to bend, was likely easily to penetrate the softly ossified sacrum, and there was additional danger of its breaking. A hard steel, and not over sharp needle is the best for the purpose.

At the other extreme of life the cornual membrane hardly exists at all; the membrane is tough and probably semi-ossified or calcified, and the bony lips of the aperture have almost fallen together like the alveolar walls of the sockets when the fangs of a tooth have been long removed. These facts I have discovered when examining the anatomy of the parts in the dead body. I fancy right away through life that the aperture, covered in by this membrane, is of variable proportions, and is no more to be depended upon than is an invariable proportional breadth of the cavity of the nostril.

Thinking that possibly the results of injection might be of a purely moral nature, I had a stiletto made wherewith to simply puncture and enter the space without injecting any fluids. I have had no results from such punctures, good or bad.

Enuresis is said by G. F. Still to have been epidemic in some institutions. This tends to prove that temporarily, at all events, the condition may be of an hysterical nature.

Sheffield, in the *Therapeutic Gazette* says "that all cases may be divided into two classes, one due to spasms of the detrusor muscle in those of nervous temperament, and one due to atony of the sphincter in delicate subjects."

It may be interesting to note the methods of treatment of enuresis a generation or two back. On page 581 of Cooke's "Marrow of Physick," published in 1765, is a description of the treatment of "Incontinentia Urinæ, commonly called 'Pissing in Bed.'" He says that children have oft been cured with fryed mice, stones of a hare burnt, snails, shells and all burnt. Those elder may purge with phelegmagogues. He also recommends the pouder of a live toad burnt in a new pot, and hung abut the neck in a bag. Then he says, are also good, sow's bladder, and burnt ashes of an hedge hog; but above all is pudenda suilla.

As far back as 250 years ago it is evident the incontinentia urinæ taxëd severely the ingenuity of the physicians of those days.

NOTES OF CASES.

Mary H——, aged 21 years. Worse during night, but has occurred frequently also during the day. At the end of December, 1904, and again on January 7, 1905, large injections easily and successfully made with an anesthetic. On February 25, she reported herself as cured since last injection.

James F——, aged 13 years. Nightly wettings as long as the mother can remember. January 23, 1905, injection. February 1, report, twice since last injection; injected again. February 15, report, not happened since last injection. March 18, report, no further trouble.

March, 1905, a neurotic woman, aged 32 years, just about to be married. Trouble night and day for past two or three years. Frequently at night; and she gave us an ocular demonstration of how agitation during the day affected her. The injection given with great ease. A week later she reported no further day trouble and lessened frequency at night. I wanted to inject her again, but she apparently considered herself now fitted for her marital duties, expressed her thanks, and departed, and is married.

A. E. L——,male, aged 7 years. On and off day and night from infancy. Injections given on January 18, and 21. January 28, now occurs only twice a week, previously every day or night. Gave further injection, and repeated it on February 11. February 18, report, not happened since January 28. March 4 and 18, similar report to that of February 18.

F. B——, female, aged 10 years, trouble on and off for four years. Injections January 4, 7, and 14; result good. February 11, cure remains. February 25, relapse; same date another injection. March 20, report, no further relapse. A later report also good.

G. L——, female, aged 10 years. Two years' history night and day. January 14, injection; result 50 per cent. improvement, February 4, and 18, injections; further improvement, but case not cured. February 18, injected large syringeful. March 25, report, not happened since.

A. P——, female, aged 13 years, trouble for some years. Subject of arrested Pott's disease. In January gave two injections without the aid of an anesthetic. Was able to inject but small quantity of fluid. February 15, injected ʒviij under ethyl chloride. February 25, mother reported no trouble since last injection. Same day gave another injection with difficulty. March 18, report, the case has relapsed.

E. S.——, female, aged 9 years. In December an injection without any anesthetic. January 14, further injection without anesthetic. The report on January 14, was that it had not happened again. March 18, once since last injection. On March 18, I intended to give her another injection, but using a fine badly-tempered needle broke it and left it *in situ*. It was subsequently extracted by the house surgeon and no bad results came of it.

V. L——,female, aged 8 years. Troubled night and day for a year. From January 14, to January 28, three injections given with no good result. It was very difficult to inject but a small quantity of fluid. Later gave one more injection not very satisfactorily. The treatment failed.

In February of this year I also gave two injections, large ones, and with complete success to a girl aged 19 years. She reported herself as cured from the first injection, but I have heard nothing more from her since about the middle of March.

I am just commencing to treat two other patients, and I think the success of the treatment warrants perseverance. It is certainly not uniformly successful, but the results nevertheless appear to me to be better than those obtained by any other treatment, and with improvement in the technique of the little operation may show still fewer failures.

So far I should say that males are more amenable to the good effects than are females, and that the older the patient the more quickly are the good results produced. Occasionally, like other methods of treatment, it fails completely, and with young children it requires considerable practice before it can be properly carried out.

ENURESIS AND ITS TREATMENT.[1]

By Hugh Thursfield, M. A., M. D.

Viewed from the standpoint of pathology, or in relation to its effects upon the general health of the patient, enuresis may appear a trivial and unimportant complaint, and unfortunately in the class from which hospital patients are chiefly drawn there is a tendency to regard it in that light, at any rate so long as its manifestations are comparatively infrequent. It is unfortunate that this view should prevail, because there are few ailments from which children suffer where the force of habit plays so large a part; and there are few habits which exercise a more marked effect upon the moral and mental well-being of the patient, or, in later years, upon his material prospects. The child in whom the habit is established is almost always timid and reserved, and not infrequently slow and dull, though it may perhaps be contended that these characteristics are associated with the condition rather in the nature of cause than of effect. As time goes on and the condition remains unaltered, it becomes a severe handicap in his life. He cannot remain at a school for more than a very brief period; and after puberty the persistence of the condition closes to him a considerable number of occupations, besides leading to physical and mental discomfort in a marked degree. From these considerations it will, I think, appear that the condition is of more importance than would at first sight be evident.

When we consider the act of micturition in an infant, it is evident that the evacuation of the bladder is a purely reflex phenomenon. A comparatively slight stimulus to the cutaneous nerves, such as is conveyed by the exposure of the body, is often sufficient to set the mechanism of the reflex in action. This active condition of the reflex persists in the majority of infants throughout the first year of life, but by the second birthday it has as a rule passed under the control of the will, and though occasional lapses may occur in the third year of life, anything like a frequent occurrence of incontinence of urine is distinctly pathological. I must here note that the education of the infant in regard to the power of control over the bladder is not to be neglected, and that an efficient nurse can often so train an infant that at the age of 18 months it can retain control of its urine during a sleep of eight to ten hours. If after the infant has reached 2 years of age the reflex evacuation of the bladder is still excited by slight stimuli which in the normal child would have no effect, the codition of enuresis must be recognized.

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[1] Brit. Med. Jour.

The greatest number of cases of enuresis occur between the ages of 3 and 10 years, though it is not very uncommon to find the condition acquired by older children; where, however, one finds it existing in adults, the history almost invariably is that they have suffered from the complaint from childhood. I have however, notes of one case in a girl of 18 who had acquired the condition about a year and a half previously, and I have seen at least one similar instance. It is usually said that the two sexes are about equally affected, but in my own experience girls outnumber the boys by more than two to one.

As a general rule the patients are able to retain control of the bladder, at least to a moderate degree, during the day, but this control disappears during sleep, but in a certain number of cases enuresis occurs by day as well as in the night, and in a still larger number the diurnal control is less firmly established than in normal children, so that, unless there are frequent opportunities of evacuating the bladder, the child becomes abnormally uncomfortable, and finally loses control.

The character of the evacuation is nearly always the same—that is there is a sudden uncontrolable contraction of the detrusor muscle, and the contents of the bladder gush out. Occasionally, however, one meets with instances where this is not the case. One of my patients, a boy aged 4, was said by his mother "to drip like a tap," and the unusual description raised the suspicion that there was present some material cause, such as the presence of a calculus—a suspicion which was not confirmed. Since then I have met with some similar instances, but they are not common. Sometimes—and this is especially true in neglected cases, where the condition has been present for years—the bladder seems to have become so irritable as to be unable to tolerate the presence of more than a few drachms of urine at a time, so that the patient passes urine at intervals of a quarter of an hour by day and night. This condition has, I believe, led to the description which is found in some text books of a bladder which has become abnormally small. I have never been able to satisfy myself that this was the case; the bladder in this condition will always hold a normal amount of fluid.

From the consideration of the facts observed I believe, therefore, that the ordinary cases of nocturnal enuresis really represent a persistence, or a recurrence, of the normal infantile reflex irritability. However, there are causes, more rarely met with, which may be overlooked. That which is perhaps most likely to escape detection is the minor form of epilepsy. This is certainly not a common cause of enuresis, but there are a certain number of cases in which other methods have failed to effect a cure, and in which a dose of 5 gr. of potassium bromide at bedtime has been immediately successful. In some of these cases there are evidences of *petit mal* to be discovered by careful inquiry, but that is not always the case.

Mentally deficient children are not infrequently the subjects of nocturnal enuresis, which is a survival of the infantile condition. Stress is often laid upon the presence of dirty habits in determining the diagnosis between imbecility and backward development, but it is a point which should be most carefully considered, for an infantile condition in this respect may occur in backward children up to the completion of the fourth year without any real cerebral defect.

With regard to diseases of the spinal cord, the only common cause of incontinence is compression of the cord in the lumbar region consequent upon tuberculous caries of the vertebræ. Ordinarily the affection is an overflow incontinence. The bladder dilates, and after the lapse of a certain time the sphincter is unable to resist the pressure of the accumulated urine, which flows slowly away. Occasionally the bladder contracts uncontrollably on the slightest stimulation, which is usually not obvious, resulting in the condition known as precipitate micturition. But in these cases, even where the angular curvature is not a marked feature, there is nearly always a definite paraplegia, and the bladder symptom is a late manifestation. A rare and obscure cause of incontinence is the presence of an occult spina bifida, but here also there is an associated paralysis or paraplegia of the lower limbs. Hence it is quite improbable that the incontinence which accompanies these conditions will be confounded with a case of simple enuresis. The same remark applies equally to the common diseases of the bladder which are associated with incontinence, stone, tubercle, and new growth, and the ordinary forms of cystitis.

So far I have considered the causes of incontinence of urine which have a definite basis in some pathological condition of the nervous or urinary mechanism, and in examining any case of enuresis it is necessary to exclude the presence of such a cause before deciding that the enuresis belongs to the category of neuroses. When no sufficient cause can be discovered by physical examination, and when the history and symptoms of the case present nothing which can arouse a suspicion of the presence of some unusual cause I think one is justified in considering the case as one of simple enuresis. Now, though in enuresis it is not possible to point definitely to the determining cause, it is easy to indicate many of the factors which predispose to the condition, and when we consider these it is evident that they have all one common feature: they all act in some way as stimulants of the afferent nerves. Now, in infants, I pointed out that almost any form of stimulation sufficed to set in motion the mechanism by which the bladder is evacuated, and the more closely one studies the character of the enuresis of childhood, the more clearly one perceives that it merely represents a recurrence to, or a persistence of, the infantile condition. There is in many medical textbooks much talk of a weak sphincter, of a loss of muscular tone, and similar defects, but I am unable to convince myself that these explanations have any foundation in the facts. On the contrary, if one goes into the history of the precise sequence of events in a case of enuresis in an intelligent child, it becomes obvious that the sphincter is efficient up to and even beyond the normal, but that the voluntary control is not established so firmly as in healthy individuals. It is rare to find the urine dribbling away in this condition; it nearly always comes with a sudden gush; in other words, the spinal center temporarily has got out of control of the cerebral center. From these considerations it becomes clear that enuresis is a phenomenon related to an instability of the nervous system—a conception which is confirmed by the frequency with which it follows such a disease as diphtheria.

I do not think it possible in the present state of our knowledge to obtain any more precise view of the definite cause of the disease, but fortunately it remains possible to trace out and attack some of the causes which most commonly excite the irritable reflex. Probably that which is most common is the presence of adenoid vegetations in the naso-pharynx. I should be expressing myself more cautiously if I were to say that it is a condition found with great frequency in cases of enuresis; for it is a tenable hypothesis that the same conditions of health which led to the growth of the adenoid vegetations produced at the same time the nervous instability. But, whatever may be the precise pathology, there can be no doubt that there is an intimate connection between the presence of adenoids and the existence of enuresis, and that the removal of the hypertrophied lymphoid tissue is the first essential step in the cure of the enuresis.

Another commonly-associated condition is the presence of threadworms. Whether these act directly as stimulants to the afferent nerves, or whether the condition of the bowel which favors their existence is the exciting cause, I believe that it is important to eliminate this factor in the production of enuresis. Jacobi lays stress on the existence of small anal fissures in children who suffer from the complaint, and I should be quite prepared to accept these as a sufficient cause if I had been able to detect them; but I have examined a considerable number of children with special reference to this point, and have not met with a single instance.

Another factor in the causation, as to which I am sceptical, is the presence of vulvitis in girls, and balanitis or phimosis in boys. These ailments are so common among children of the poorer classes that, if they were efficacious in causing enuresis, I should expect that complaint to be far more common than it is. But, where every possible excitant of the afferent nerves is under suspicion, it is necessary to insist on attention to absolute cleanliness in children who suffer from enuresis.

Next there is a group of cases in which the urinary secretion itself acts as an irritant. Hyperacidity is certainly found in some instances, and is sometimes associated with the passage of uric acid, and of a highly concentrated urine. Many authorities doubt the connection between the phenomena, but there exist cases where the administration of an alkali in fairly large doses effects a quick cure of the incontinence, and on the whole it appears to me to be probable that hyperacidity is a sufficient exciting cause.

In convalescence from typhoid fever it sometimes happens that the urine becomes cloudy from the presence of large numbers of bacteria in the urine, and in this condition I have twice met with children who have acquired enuresis, which speedily disappeared with the disappearance of the bacteriuria. In a few other instances I have found a bacteriuria in children suffering from enuresis, and, though I do not regard it as a common cause, I always examine the urine directly it is passed. In those cases where bacteriuria is present the cloudiness does not disappear after heating or by the addition of acid, and the bacteria can be easily detected by the microscope. There are not any symptoms of cystitis in these cases, so that, unless the examination be made methodically, they are apt to be overlooked.

In a healthy child none of the factors I have mentioned will produce enuresis of itself; there must be other adjuvant causes. The subjects of the complaint are generally anemic, listless, undergrown, or ill-fed, and often exhibit other signs of nervous instability; they suffer from night terrors, migraine, hysteria, and neuralgia; and there is a certain amount of evidence which points to an inheritance of instability. Thus it is not infrequent to see several children in one family affected, one or both of whose parents suffered from the complaint in childhood.

To summarize what I have said as to the pathology and etiology of the disease, there is as a basis a condition of nervous instability, which may be inherited, or is often acquired, as in those cases which follow an attack of diphtheria. Acting on this, there are a number of exciting causes, which may be grouped in three divisions: (1) Those which act on the nerve centres in the brain, as in epilepsy; (2) those which act on the cutaneous peripheral nerves and excite reflex action in the unduly irritable spinal centres; (3) those which produce irritative effects in the urinary tract.

Two points require emphasis. The first is that in order to ensure success prolonged treatment is necessary, and this for several reasons. Usually the condition has been allowed to become a habit before it is taken seriously, and it requires a long time under new conditions to break the force of the acquired tendency; and, again, though success is sometimes obtained early, relapse is frequent unless the treatment is sustained. The other point is the necessity of varying the surroundings of the patient; some patients who derive no benefit whatever from treatment so long as they continue their ordinary mode of life, improve from the moment that they are removed to a different environment, the reason probably being that some one or more of the exciting causes present in the home life of the patient are eliminated by removal to a different surrounding.

In nocturnal enuresis the evacuation of the bladder takes place as a general rule in the first two hours of sleep. Therefore the first instruction to be given is that one hour and a half after the child has gone to sleep, of course with a bladder properly emptied, it is to be awakened, and made to pass water again. This precaution in a considerable number of cases is sufficient to prevent the enuresis, but occasionally one meets with cases in which one awakening is insufficient, and then it is a wise plan to manage so that the child is awakened at regular intervals throughout the night; the intervals, of course, are made longer as improvement occurs. Secondly, it is of advantage to encourage regular habits during the day. The bladder should be emptied only at stated intervals, and these should be as far apart as is consistent with the comfort of the patient. This measure is especially valuable where there is diurnal as well as noctural enuresis, for in such instances there often grows up a habit of unneccessary evacuation. It is sometimes stated that the bladder becomes contracted and incapable of retaining more than a few ounces at a time, and though there may be such cases, I can only say that they are outside my own eperience, and that, as a rule, in enuresis the amount evacuated is quite equal to the normal contents of a healthy bladder.

The next point of importance is to avoid those articles of food and drink which have an irritative or diuretic effect. Tea and coffee are to be absolutely prohibited; and the last meal and the last drink should be taken at least an hour before bedtime. In addition to tea and coffe, sugar in all its forms must be eliminated from the diet. Sweets are most potent causes of relapses. With these exceptions, the ordinary plain diet suited to healthy children is permissible, for though some authorities advocate the elimination of meat from the diet, I have never seen any reason to follow that rule. It is a common practice of mothers to limit the amount of fluid taken by the patient, but I have no doubt that the consequent increase in the concentration of the urine is apt to increase the tendency to enuresis. On the contrary, the child should be permitted to drink water or milk as it desires, provided it be taken at regular times and limited in quantity at the last meal.

In nervous, excitable children, school work should be discontinued for a time, but in the children of the poorer classes this is not always attended with the desired result, for they find excitement in the streets. When the diet and the habits of the patient have been corrected, there are further measures which aim at the elimination of the exciting causes. Scrupulous cleanliness, the removal of adenoid vegetations, the treatment of anemia, and the importance of air and exercise, must receive proper attention. In boys, circumcision is sometimes advisable, and if threadworms are present, special measures must be used to get rid of them, ordinarily an easy task.

The question of drugs is important. The number that have been employed is enormous, and many of these have been praised as efficacious. I have used a large variety, but have found only three of much service, and of these three belladonna or atropine is by far the most successful. It may be used in the form of the extract, or the tincture, or as liquor atropinæ, and each has its advocates. I do not regard the point as essential, though personally I always employ the tincture. What is essential is that the dose should be sufficient to produce evidence of its action, and that it should be used over a long period. I usually give 10 minims of the tincture three times a day as the initial dose, and raise the dose week by week up to a drachm three times a day. With these doses in a large number of cases immediate benefit is obtained, and usually as time goes on the frequency of the enuresis sensibly diminishes, and finally disappears. At this period it is essential not to abandon the drug, but to slowly diminish the dose until it can safely be dispensed with. A period of three to six months will usually be required for the permanent relief of the complaint, but occasionally there are cases where that time must be considerably prolonged.

The danger of poisoning is slight. Of the many cases I have treated in this manner only one has had delirium, though loss of accommodation is nearly always present in the beginning. This, however, soon passes off, and it is not an indication for relaxing the use of the drug. Dryness of the throat and mouth and a smarting sensation in the pharynx are also complained of sometimes, but these also are temporary discomforts. I employ the belladonna in conjunction with potassium citrate in the majority of cases, and in a few instances where I have had reason to believe that hyperacidity of the urine was the chief cause I have found potassium citrate alone to be efficacious. The third drug which has proved successful is urotropin, and this is especially indicated in cases of bacteriuria. It must be given well diluted, for in concentrated solutions it has been known to produce hematuria, and painful micturition. I used it on a series of thirty consecutive cases, with good results in nine instances.

Of other drugs my experience has been disappointing; I have never succeeded in obtaining good results with ergot, antipyrin, rhus aromatica, lycopodium, or any of the other drugs which others have found useful. In excitable children, who are the subjects of night terrors, a small dose of potassium bromide at bedtime is beneficial, and in ill-nourished, anemic children, iron and strychinine are good tonics.

Electrical treatment, with one pole in the urethra, or over the pubes, and one on the lumbar region, is said to succeed where other measures fail, but it also fails frequently, and I cannot ascertain that the cases in which medicinal treatment fails are cured by the employment of the electric current. It is true that all treatment in this complaint is empirical, but in my experience comparatively few cases resist, if the treatment indicated is perseveringly carried out. When, however, failure still attends one's efforts at the end of six months and there is no sign of improvement, the patient should be removed entirely from his or her surroundings, and placed in bed under supervision. What have been apparently hopeless cases often derive striking benefit from such a course, and, the force of habit thus attenuated, the final results are usually good. I believe that the prospects of treatment are better than is usually supposed. I estimate that between 70 and 80 per cent. of my cases get well in about four months, that 10 to 16 per cent. recover in about eight months, and that from 1 to 2 per cent. remain almost as bad as before. Of these last, however, I do not despair; some of them are improved; all are capable of improvement, but subject to relapses. The only point remaining to notice is that I find boys more amenable to treatment than girls, and that the most hopeless cases are those in which mental development is below the average. Of cases occurring in young adults I have little experience, but I believe that the majority are in girls, and that they are usually cases where treatment in earlier years has been spasmodic or even wholly neglected.

THE CAUSES AND TREATMENT OF ENURESIS*

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This is a subject in which I have long taken great interest, and in 1899 I published in the "King's College Hospital Reports" my ideas on the matter, which followed a number of cases successfully treated by an antidiabetic diet. Since then many failures by this treatment, together with more work at the subject, have induced me to alter my views, or rather to enlarge them.

I will now endeavor to offer an explanation of the conditions which will bring all the varieties of this malady into line, and of the reasons for the success or failure of the various treatments in common use.

CAUSES.

Nocturnal enuresis is a symptom the causes of which are believed to be various. Dr. Goodhart, in his work on "Diseases of Children," says:

"There are a few conditions which require more careful study than this, and few in which such a variety of circumstances conspire to bring it about. Whoever will treat enuresis with success must be prepared for a preliminary inquiry of a somewhat complicated nature."

This opinion becomes confirmed on reading the views of various writers on the subject, for it is found that hardly any two are in agreement as to the causes of this distressing malady. It may be that as the causes are admittedly various there is some truth in all. It will be our endeavor, then, to extract from this mass of contradictory material some general ideas which may bring these dicta into harmony, and so formulate a broad basis for treatment.

CONDITION OF THE URINE.

All writers agree that the urine shows variations from the normal. Owen noted that the urine might be acid or alkaline. At times it is extremely acid, loaded with urates and of high

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*Read at a meeting of the Folkestone Division of the British Medical Association.—*Brit. Med. Jl.*

specific gravity. In these cases it is held by some that, being abnormally irritating, the urine excites the reflex act of emptying the bladder without the intervention of the consciousness. The more common variation, however, is a condition of low specific gravity, neutral or alkaline urine with triple phosphates or oxalates, a few pus cells, and a trace of albumen. Then it must be the amount of the urine which excites the reflex, for the quantity passed in twenty-four hours, and especially at night, is thrice or even more times than the normal. There is, in fact, a condition of polyuria. It is quite common to find a bed deluged with urine an hour or so after a child has been taken up and made to pass water.

Typical examples of urine from enuresis cases are as follows:

(*a*) Specific gravity 1030, highly acid reaction. Total quantity in 24 hours, 20 oz. Color, mahogany. Urea, 6 per cent. Deposit, uric acid crystals in abundance. No albumen or sugar.

(*b*) Specific gravity 1005. Alkaline reaction. Total quantity in 24 hours, 3 pints. Color, very pale straw color. Urea, 0.3 per cent. Deposit, triple phosphates with a few pus cells. Trace of albumen. No sugar.

CONDITION OF THE PATIENT.

But if the urine is admitted to be abnormal, there is an equal agreement that the subjects of the complaint are also abornormal. The varieties of this abnormality have by different writers been made to include a very large numberof the disorders to which the flesh of childhood is heir. Rachford found anemia in 80 per cent. of his cases, and it is always present in the alkaline class. Trousseau says enuresis is essentially a neurosis, and often found in families prone to epilepsy. Some have considered it a mild form of nocturnal epilepsy. Goodhart says the tone of the nervous system is at fault. Some authorities have described the sufferers as mainly of a neurotic type, while others as flabby, anemic and lymphatic. A vasomotor neurosis of the renal vessels has been suggested as an explanation. Whitla finds enuresis very common in the neglected children sent into the industrial and charity schools, where it is often associated in its worst forms with a low standard of intellectual development. Ashby and Wright consider that mere delicacy of health may give rise to enuresis. It is usually affirmed to be more common in boys than in girls, but this is not the writer's experience. Of 38 cases, Goodhart found 20 girls and 18 boys. Eustace Smith says the worst forms are found in girls, and West and Whitla confirm this. Many observers have noted the occurrence of enuresis in the subjects of rickets, rheumatism, adenoids and constipation. Slow carbonic acid poisoning has been given as a cause. Thus, G. W. Major and Zeim explain the incontinence of mouth-breathing children. Some local condition of the urethra or bladder or their neighborhood has also been blamed as a cause. To mention only a few of these will be sufficient—namely, long prepuce, worms, hip-joint disease, polypus of the rectum, pinhole meatus and urethral caruncle. Nocturnal enuresis has been noted as an early symptom in nephritis, renal calculus, diabetes and in tuberculosis of the urinary organs.

CONDITIONS OF THE NERVOUS SYSTEM.

It has been held by some that in these cases the nervous system is either generally or locally at fault. By others it is attributed to a retrogression to, or a continuation of, the infantile condition, to laziness, or to defective training. That there must be a debility of the whole nervous system is apparent from the large number of these sufferers among the insane, and also, as Whitla noticed, in the children of the charity schools. There can be no doubt that the habit of enuresis often remains long after the cause has been removed. It is owing to this that many methods get the reputation of curing when they have only broken a habit. In this category we may place nearly all those cases which are cured by operative procedures, and by the various forms of local treatment. Thus is explained the frequent failure of each method and the fact that some methods, such for instance as circumcision, have been followed by enuresis in subjects who had not previously suffered from it. The contention is that such an impression is made on the nervous system by the surgical or other method of procedure, that the attention is forcibly directed to the new source of discomfort, and the habit of emptying the bladder during sleep is broken. The tendency to spontaneous cure is well known. Sachs is of the opinion that profoundness of sleep alone is sufficient to cause the phenomenon. Goodhart and others have noticed that in enuresis sleep is too profound, and it is a matter of common observation that when taking such a patient up at night, he hardly ever quite awakes, and that he relapses again into slumber directly he is put back into bed. Such cures as are brought about by corporal punishment, or the cure by the American method of vigorously spanking the nates, may operate by causing sleep to be less profound and so breaking into the vicious circle. But corporal punishment sometimes acts in a way not intended. The writer knows of boys who attempted to keep awake all night in order to avoid a thrashing, of others who tied pieces of string around the prepuce, and of one case where sloughing of the penis resulted from the application of a brass ring for the same purpose.

CONDITIONS OF THE DIGESTIVE SYSTEM.

But behind the admitted weakness of the nervous system there is always a digestive disturbance. In the writer's opinion this is the key to the situation. Owen and several writers have noted the great importance of diet in treatment. But Owen admits that all treatment is empirical. A. Jacobi says that whenever the urine is abnormal the digestive system must receive attention, and treatment is useless until the normal action of the digestive organs is restored. Goodhart recommends abstinence from meat, and this undoubtedly does good where the urine is too acid. Whitla noted the frequent bad effect of a too starchy diet. This is most noticeable where the urine is neutral or alkaline. The curative effect of a non-farinaceous diet is often immediate. The fact that the alkaline variation of the urine is the more common, accounts for the large measure of success which this treatment has effected. The researches of Luff, Chalmers Watson, and others, on intestinal fermentations and bacterial processes in the digestive organs, make it certain that the formation of a toxin as a result of their action is a very important element in the condition under review. In fact, it is held that this is another condition which is in a large measure the consequence of intestinal sepsis. Dr. S. J. Wright, in the "New York Medical Record" for July, 1897, records a case of a lady of 34, where the trouble had existed from childhood. She was cured by taking naphthol (an intestinal antiseptic) internally. It is now admitted that the highly acid urine of gout is due to bacterial action in the intestine. In the alkaline variety of enuresis the polyuria is probably due to a toxin acting on the renal vessels and causing their dilatation, or, even more possibly, to its effect on the general blood pressure.

In the "British Medical Journal" for February 17th, Dr. Bushnell describes a condition of bacilluria, in which large quantities of living bacilli of various sorts are eliminated by the kidneys. This he says is a not infrequent cause of nocturnal incontinence in children.

One cannot but be struck by the ease with which this view that intestinal sepsis is an essential part of the condition explains the facts of enuresis. Enuresis with acid urine is the result of putrefactive decomposition of the albuminous constituents of the food. Enuresis with neutral or alkaline urine is the result of putrefactive decomposition of the farinaceous constituents.

Intestinal sepsis occurs most easily in those whose vitality is depressed from any cause, and hence all the various conditions which have been named as causes are brought into line by this hypothesis. Intestinal sepsis is much influenced by the state of the general health, which accounts for the curative effects of tonics, for spontaneous cure, for recurrence, for the effects of regular diet, for the cures which so often follow on the improved health consequent on the removal of adenoids or other morbid conditions, and for the failure of altering the position during sleep or tilting the end of the bed, as noted by Crawford.

This fact of intestinal sepsis, combined with a nervous system (and consequently the local nervous mechanism of micturition) temporarily weak, together with what has been said as to the formation of a habit of enuresis, offers, indeed, an explanation of the success or failure of all the methods of treatment in vogue, and forms concord among the many apparently diverse explanations of the cause of enuresis which have obtained in the past. Hence is made plain the occurrence of the condition occasionally in adults, and its much greater frequency in children. The effects of intestinal sepsis are more manifest, and the results tend to remain longer as a habit in children owing to the little assistance which the breaking of the habit receives from the will. It is often necessary with them to make an impression on the mind, by surgical or other measures as before mentioned. There are no commonly-used treatments which cannot have their success or failure explained on the theory of intestinal sepsis, with a weakened nervous system as an essential element, at some time or other in all cases.

TREATMENT.

General Considerations.—When undertaking the treatment of a case of enuresis it is first necessary to consider:

1. Whether the case is simply one of general want of tone.

2. Whether intestinal sepsis is now a prominent feature, and if so, is the urine passed at night abnormally acid, and of diminished quantity, or is it of low specific gravity, alkaline or neutral, and of increased quantity?

3. Or whether the case is simply one of habit remaining after the cause has been removed, or after improvement in the general health has become such that enuresis need not occur.

As a rule it is quite easy to determine this point, but one must own that it is not always possible to be quite sure. In practice it is found that failure on one line of treatment will soon be followed by success by substituting one of the other two. At all events, viewing the matter in this way, we have a knowledge which enables us to judge with accuracy how long persistence in one line of treatment should be allowed.

Tonics.—In the first of these classes are those cases which different writers describe by saying that the children do not look ill, and also those in which anemia is present without much evidence of intestinal sepsis, and mostly also those who have not suffered long. These are the cases which Ashby and Wright allude to as due to delicacy alone. Almost any good tonic will effect a cure. Many physicians have a preference for phosphate of iron in its popular form, or perchloride of iron as strongly advocated by West, or strychnine as advised by Ringer. Included in this method are all measures which tend to improve the health, such as cold douches, massage, "running wild" in the country, change of air, or any of the many things which we are in the habit of prescribing to improve the general health and tone of our patients. The practice of taking the patient up several times at night is a convenient method of protecting the bed, but it is in no sense a means of cure.

TREATMENT OF THE DIGESTION.

In the second class, evidences of indigestion are to be found more or less prominent, and all the causes which produce intestinal sepsis are to be looked for, and, if possible, removed. These are the cases which are often so easily cured by diet. In the acid form the cutting off of meat alone may be followed by success, and in the alkaline form the use of a non-farinaceous diet is often immediate in its good results. The failure of either diet is due to such method alone not being sufficient by itself to stay the course of an intestinal sepsis once begun. There are, of course, a number of ways of combating intestinal sepsis. A good routine treatment consists in securing a good daily evacuation of the bowels by giving ¼ gr. of calomel every night and a mild saline aperient in the morning. In addition one may give one or more of the many drugs which aid intestinal asepsis. Further assistance may be obtained from any of the health-improving methods before mentioned, which can be selected at the discretion of the physician. He must also decide each case on its merits, as to whether medicinal tonics can be used at the same time that the septic condition of the digestive organs is being combated.

ILLUSTRATIVE CASES.

1. Enuresis had existed for a long time in the son, aged 7 years, of a lodging-house keeper. He was at once cured by being taken into hospital and kept on the ordinary hospital diet without any other treatment.

2. A girl, aged 21 years, the servant at another lodging-house, was cured as rapidly by the same method.

The obvious cause in each instance was intestinal sepsis from irregular and injudicious feeding.

3. A girl, aged 10, had had enuresis for three months. She had immediate freedom from this symptom while taking a non-farinaceous diet, but for the first six weeks relapse followed the slightest consumption of starchy food.

4. A boy at school with enuresis and highly acid urine showed no improvement when taken off meat. He was, however, rapidly cured by a course of ¼ gr. calomel every night, and 5 gr. of salicylate of soda thrice daily.

BREAKING THE HABIT.

In the third class one may look for sources of irritation which might require treatment—for example, worms, fissure *in ano*, adherent, prepuce, etc. This is more especially the case as one may, so to speak, "kill two birds with one stone." That is to say, the operative treatment necessary to cure the local condition, acting strongly on the mind, or by making sleep less profound, frequently breaks the habit of enuresis. And this it may do in spite of the fact that the local condition had nothing whatever to do with the formation of the habit. Other surgical methods, such as blistering the sacrum, blistering the penis, freely cauterizing the urethra, the passing of large metal bougies, and the various ways of using electricity—all act in one or more of these two ways. Equally efficacious and far more rational is it to talk seriously before the patient of the possibility of one or other of these measures having to be adopted if improvement does not immediately occur. This is the class of case which the schoolmaster, much to his satisfaction if the physician has failed, succeeds in curing by corporal punishment. As, however, he cannot be expected to diagnose as to which of the three classes the case belongs, the odds are against his success, and, as previously pointed out, worse evils than enuresis may result.

FORMER TREATMENTS.

Of other treatments, one need mention a few which have not been previously dealt with. The success or failure of all others is easily explained if the view herein advocated be adopted.

The limitation of the amount of fluid drunk never gained much reputation—in fact, it rather tends to aggravate than relieve the symptom, by adding to the digestive disturbance.

Belladonna in small doses acts as a tonic to the nervous system, and may, as other tonics, succeed in the first class of cases. When given in semi-poisonous doses it acts on the mind, and is then successful by diverting the attention. Professor Fonnsagrives thinks it acts by making sleep less profound, so that control of the sphincter muscles is not lost. This is interesting in connection with Macalister's opinion that belladonna acts better when combined with strychnine. A. Jacobi says belladonna is only useful when there is vesical catarrh.

Sedatives such as chloral and bromide may succeed for a time by blunting the nervous mechanism of micturition, but they do not touch the cause, and their use is consequently unscientific.

CONCLUSION.

In conclusion I would contend that nocturnal enuresis is capable of the simple explanation here given, that order is by this explanation introduced into the chaos of conflicting views and opinions, that reasons are now obvious for the success or failure of the various methods of treatment formerly in use, and that treatment can now be carried out on rational and scientific lines instead of by the empirical and haphazard methods of the past.

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SOCIETY PROCEEDINGS

SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN

February 16, 1906

MR. A. H. TUBBY, Chairman

MENINGOCELE.—Mr. Howell Evans illustrated with a stereopticon demonstration some cases of meningocele lumbosacralis, meningocele occipitalis, and thyroglossal appendage. He disagreed with the statement that spina bifida is most frequently due to nonunion af the laminae of a vertebra or vertebræ. On the contrary, the interposition of the membranes prevents normal union. The protrusion cysts he attributes to the toxicity of certain definite chemical bodies of primary maternal origin. These poisons, of a diffusible nature, are transferred to the embryo and produce an increase of secretion by stimulating certain epithelial or secreting surfaces.

JAUNDICE IN CHILDREN.—Dr. F. J. Poynton read a paper on this subject. In the first case, that of a girl three months old, a pronounced obstructive jaundice had continued since birth. The temperature for the most part was below normal, the liver enlarged but not tender nor hard, and the spleen could not be felt. Some slight diminution in the jaundice had been noticed between birth and the age of eight months, but it was still well marked at that time. Occasionally bile was observed in the stools, upon which occasions the skin improved in color. Fats and proteids were undigested, and flatulence was troublesome. The jaundice became gradually less marked, although the stools did not regain a normal color, and the child was put on a diet of ass's milk. By the time she was a year old she was perfectly well, without a trace of jaundice. A viscid bile, with possibly undersized bile passages, was the cause assigned to the condition. In the second case obstructive jaundice was discovered in a boy three days old. In neither of these cases was there any sign of congenital taint. In this case the liver was large and tender, the spleen not felt. As in the other, a little bile was sometimes found in the stools, attended by diminution of the jaundice. Two months later the liver was more nearly normal in size, and the stools better color, the jaundice entirely disappearing after a time.

SPLENOMEGALIC BILIARY CIRRHOSIS.—Dr. E. Cecil Williams presented some notes of a case of this disease in a male child 6½ years old. His mother had died of tuberculosis, and there was some evidence that his father had had syphilis. The child himself had never been robust, and in his fourth year had jaundice with an enlarged liver. He was taken to the Bristol Children's Hospital. His body was of a lemon tint, and the conjunctivæ were yellow. The veins over the abdominal surface were enlarged, and the abdomen itself greatly distended. Liver dulness extended from the fifth rib to the level of the umbilicus where its free edge could be felt, the left lobe could also be palpated below the ensiform cartilage. The spleen extended from the eighth rib to within two fingers' width of the iliac crest in the axillary line. No ascites nor edema of the legs was observed, no enlargement of lymphatic glands. Fingers and toes showed distinct clubbing. Urine, acid 1027, no albumin, no sugar, trace of bile. Blood count; hemoglobin 62 per cent.; red cells 5,400,000 per c.mm., white cells 9545. Differential count: polynuclear 38 per cent., uninuclear 3.3 per cent., eosinophile 11.6 per cent., lymphocyte 46 per cent. When taken to the hospital his temperature was normal, but later rose to 101 F., the jaundice increasing at the same time and decreasing with a subsequent gradual fall to normal. His stools, pale at first, later became yellow. Dr. Williams regarded this as a case of juvenile splenomegalic biliary cirrhosis, of the type described by Gilbert and Fournier, in which clubbing of fingers and toes appears much more constantly than in the case of adults. Whether the spleen or the liver was primarily affected could not be determined. Probably the condition of both was due to some poison with a selective action on the spleen which then passed along the splenic vein, affecting the smaller bile ducts and producing a descending cholangitis, or it may be the toxin was of intestinal origin and ascended the smaller bile ducts and so reached the spleen by way of the splenic vein. In the latter case, however, the infection would be traveling against the blood stream. Antisyphilitic remedies had given no results, and sodium salicylate had proved the most useful drug.

Tuberculosis of the Stomach.—Dr. F. Langmead presented some specimens of tuberculosis of the stomach, one taken from an infant 8 months old, which had whooping cough, vomiting only after the paroxysmal cough and showing no symptoms indicating the condition of the stomach. Autopsy revealed general tuberculosis, affecting the meninges, lungs, spleen and kidneys. Throughout the intestine were small tuberculous ulcers especially numerous in the duodenum and jejunum. Submucous tubercles, six in number, were found on the anterior wall of the stomach and two on the greater curvature. Each was capped by a tiny ulcer. In distribution they followed the arteries. Another specimen was from a child about two years old, suffering with bronchitis and whooping cough when admitted to hospital and dying a few weeks later. Autopsy revealed general tuberculosis, a caseous gland having ruptured into the right bronchus occasioning acute caseous broncho-pneumonia, with softening and cavity formation. Tuberculous ulcers were found throughout the small intestine and on the anterior wall of the stomach. A third case was that of a child who was brought to the hospital in a state of collapse, again a caseous gland having ruptured into the right bronchus, acute pulmonary tubercle resulting. There was also general tuberculosis, with ulcers in the stomach and intestines.

ALOPECIA AREATA NEUROTICA.—Mr. W. Gifford Nash presented a case of symmetrical alopecia areata neurotica accompanied by a bullous eruption on the face. The patient was a girl, 14 years old, who had suffered at the age of twelve from spots on face and hands, said by the medical man who attended her at that time to "resemble pemphigus. The eruption would appear in a few hours as vesicles, which in a few hours scabbed over and fell off, leaving a brownish discoloration." On November 7, the hair along the course of the right supra-orbital nerve fell out and four days later blister-like spots, similar to those of two years ago, appeared on the face. Ten days later the hair over a similar area on the left fell out. The eruptions were often symmetrical in distribution, over the eyes, on the cheeks or sides of the nose or in the middle line of forehead or chin. The falling of the hair was preceded for a few hours by a burning sensation, generally at night, the hair coming out when brushed the next morning. It left the skin smooth, white and shining, without any tendency to scurf, and with defective sensation. A few club shaped stumps found around the edges of the bald spots correspond precisely with the description of those found in alopecia areata. An attack of measles which the patient suffered had no effect upon the disease. For several months similar attacks followed, the hair falling over the occipital nerves and again over the supra-orbitals, accompanied by the eruptions on the face. Excitement or worry, as over a child's party or over school tasks, seemed to precipitate the attacks, and Mr. Nash thought the cause was in all probability entirely central, the eruption being classified as pemphigus hystericus.

RENAL CALCULUS.—Mr. Nash also presented two cases of renal calculus in children under 10 years of age. The first patient, a boy 8 years old, was brought to the hospital suffering from abdominal pain and troubled with frequency of micturition, both of which dated from early childhood. The left kidney could be distinctly palpated. There was pus, but no crystals in the urine, which was acid. A radiograph showed negative results. Lumbar incision was made, exposing the left kidney, and a stone was felt in its pelvis, which weighed 30 grains when removed. Seven small stones also were washed out of the kidney. The patient made a good recovery. The second case was that of a child four years old, who was brought to the hospital last October. Since he was two years old he had occasionally passed bloody urine, and he frequently complained of a cold feeling in his abdomen. He also cried at night and twisted his legs. A trace of albumin was found in the urine, but no pus or crystals. The patient was not troubled with frequency of micturition, nor with vomiting, and there was no swelling or renal tenderness. Skiagraphs showed a shadow in the region of the left kidney. A lumbar incision was made and the kidney exposed and brought out of the incision. A stone was found lying in the renal pelvis, and presented some difficulty in removal, as it was flat in shape with a sharp edge. Immediately venous blood began to well up from the kidney, and although some vessels that were seen bleeding were ligated, the incision in the cortex sutured and gauze packing employed, the flow continued to a dangerous extent, and the kidney was removed. The stone weighed 25 grains. In spite of some suppuration, the ultimate recovery was good.

PARENCHYMATOUS GOITRE.—Dr. A. Ernest Jones showed a child six years old having a central tumor with extensions on both sides, as large as a small orange. The swelling began gradually six months before. It was soft in character, and higher up than thyroid tumors generally are. There were no signs of Graves' syndrome.

SCURVY.—Dr. George Carpenter showed an infant, ten months old and slightly rickety and anemic. Hemorrhagic gingivitis was present, together with subperiosteal hemorrhage of the left tibia and hematuria. Blood casts were in the urine, but no others. The child had been fed on patent foods and milk.

EDITORIAL

HABIT SPASM IN CHILDREN

G. F. Still defines habit spasm as "certain oft-repeated and seemingly purposeless movements which most commonly affect the face and head, and which, although they may change in character from time to time, are for varying periods persistent, whether the movement be a simple twitch of one muscle or the more complicated action of several muscles."

As will at once be recognized, it is a very common affection, the form most frequently observed consisting of a rapid blinking of the eyes, or possibly a "screwing up" of the eyes. In certain cases this is the only form of spasm that develops, but more often others follow it, the original spasm either persisting along with the later forms, or replaced by them. Occasionally one sees the eyes themselves affected, turning suddenly upward or sideways, or rolling in various directions. Various movements of the face are also not uncommon, twitching of nose or mouth, eyebrows or forehead. Sometimes the head is nodded or shaken, or tossed abruptly upward. Less commonly the limbs are affected, and the arms more frequently than the legs. The movement most often seen is a shrugging of one or both shoulders. Still gives an account of a female child of 11 years, who for three weeks had the habit of snapping her fingers, a habit which at the end of that time was suddenly abandoned and replaced by an upward jerk of the head. Another girl, 8 years old, struck her chest repeatedly with her hand, changing to the blinking habit and after that a jerking of the head. Still another child, a boy of 8 years old, blinked for eight weeks or so, and then began to "paw the ground like a horse." A girl of the same age always stood on tiptoe when about to speak. Movements of the trunk are uncommon, but do occur. A very annoying, and not uncommon, form of habit spasm or "tic" is the repetition of some peculiar and meaningless sound, perhaps an articulate word or syllable, perhaps a mere grunt or gurgle or clearing of the throat. One curious feature of habit spasm is the fact that it decreases or ceases entirely in many cases if the child is conscious of being watched.

An almost endless variety of forms exist, even one which has been, aptly enough, termed "psychical tic." This is generally a feature of a case in which the movements have been marked. In one girl, 8 years old, the first symptom was the usual blinking, this followed by shrugging of the shoulders, and this by the use, apparently without realization by the child, of obscene language. A boy, 10 years old, began with clearing the throat, followed by a frowning movement with a jerk of the head, and two years later he insisted that he had "microbes on his hands" and refused to take food from them. Commonly, however, the "psychical tic" is manifested in great excitability, passionateness or morbid waywardness.

The sexes are about equally affected, with a very slight preponderance in the number of girls. The greatest number of cases occur between the ages of 5 and 9, and we almost invariably have a history of nervous instability, as shown by the disorders associated with the spasm, nervousness, headache, somnambulism, and enuresis. Rheumatism is frequent in the family history. Mental strain, shock or excitement are frequent etiological factors, and so are various forms of local irritation, dentition, carious teeth, ocular defects, catarrh and adenoids.

The difficulty in diagnosis lies in distinguishing some forms of tic from some forms of chorea. In many cases this difficulty is not met with. In tic we have a repetition of one movement or set of movements, whereas in chorea the movements vary irregularly. Habit spasm is usually much more limited in distribution, and is lessened by watching, whereas chorea usually increases under observation. It is unsafe to attach too much importance to the last named distinction, however, as it may occasionally be reversed in both cases. Also, a slight chorea, limited in extent, may be difficult to distinguish from some of the habit spasms, and a hasty diagnosis is frequently impossible.

Yet a fairly prompt diagnosis is important, since the treatment of chorea is diametrically opposed to that of tic. In the former, rest in bed is indicated, whereas outdoor life is the best treatment for the latter. Lessons must be stopped, and recommenced only after pronounced improvement, and then tentatively. Any form of local irritation should be discovered and removed, excitement and fatigue avoided, and the child should not be scolded or punished for the peculiar movements, as is too often the case when parents set them down to "naughtiness" or carelessness. In certain cases, the child does better at school than at home, but this is when the home influences are such as to encourage neurotic tendencies. Always late hours should be carefully avoided. Still cautions against the removal of adenoids except in cases of extreme necessity, as the "nervous disturbance caused by fright of the operation or of the anesthetic has made some cases of habit spasms much worse." As for drugs, the most useful is liquor arsenicalis, 3 to 4 m., with 5 to 10 gr. of bromide three times a day. This is kept up for 3 or 4 weeks, reducing the arsenic if necessary, then discontinued for a fortnight, and resumed again for another period of three or four weeks.

Experience seems to show, however, that change of environment, "especially living among strangers," is often of more avail than drugs.

ABSTRACTS

Immunization Through Milk.—B. SALGE (Jahrbuch für Kinderheilkunde, 1905, Band II, 3d series, p. 486). Under the above title the author describes the continuation of his work on the subject of the passage of antitoxin through the intestinal walls of infants. In the former work he showed that antitoxin when fed to infants in the form of heterologous serums did not pass from the intestinal canal into the circulation, while antitoxin present in mother's milk as a result of either active or passive immunization would penetrate the intestinal walls and be found in the circulating blood of the sucking child. The first portion of the present paper is occupied by replies to certain criticisms of his former paper. Replying to Seigert's criticism that his method of testing the antitoxic power of bloods might be at fault or questionable, he again gives some of the details of the method and points out the features of it which demonstrate its delicacy. As the method was devised by Marx, and is approved by Ehrlich who originated the now thoroughly well recognized and accepted system of antitoxin testing, it is most unlikely that the method used was at fault. Salge also replies to the statements of Ganhofner and Lange that the stomach of a child of five days old can completely digest the small amounts of albumins such as Salge fed in the form of serum, and thus destroy the antitoxin, but that when larger amounts are given, antitoxin is absorbed because of an insufficient digestive power, that he also considers this as possible, but that such a procedure of over-loading the digestive powers could have no solid basis as a useful therapeutic measure. The author now seeks to learn whether the antibodies present in the milk of actively immunized animals will be absorbed by the infants fed upon such milk. His first experiments were made with the milk of a goat immunized to diphtheria. This milk, containing one-twentieth of an antitoxic unit per cubic centimetre, was fed in its raw state to three infants. The amount of antitoxin present in the infants' blood was determined in each case before the milk-feedings were inaugurated. The first child when four days old began to receive the goat's milk, and during the following three weeks took two litres. At the beginning of the experiment the child's serum contained a total of five antitoxic units, and the dose of milk per day also contained five units, and yet at the end of the three weeks' treatment the test of the child's serum showed no gain in antitoxic strength. The results were practically the same with the other two children fed with the goat's milk, although their ages were nine and thirty-four days respectively. In neither of these children did the tests of the antitoxic strength of their serums show any increase after the milk-feedings. Salge then tried the effect of feeding the milk of a goat immunized by the subcutaneous injection of typhoid bacilli. The milk of the goat contained sufficient typhoid protective bodies so that 0.04 of a cubic centimetre of it would protect a guinea pig from the injection of ten fatal doses of typhoid bacilli. Child number three of the diphtheria series, when nine weeks old, began to be fed two hundred and twenty cubic centimetres of this milk a day, but after three weeks of such feeding no typhoid immune bodies were present in its blood serum. Similar results were obtained in a second child in which the feedings began at the twelfth week. The author concludes that the feeding of infants with animals' milk containing antitoxic and immune bodies does not bring about the transference of those bodies into the circulating blood of those infants. Salge's experiments as a whole show that the specific properties of mother's milk are available for the infant, and those of cow's milk for the calf, but there is nothing gained by the feeding of the cow's milk to the infant.

Mastoiditis in Infants.—Oppenheimer (Medical Record, March 10, 1906) believes this is a much more common condition than is usually recognized. Hartmann found pus in the mastoid antrum of 85 cases out of 108 autopsies of atrophic infants dying of gastro-intestinal disease. Preysing likewise found 81 per cent. of such cases in 154 autopsies and in only nine was there perforation of the drum membrane. "The general symptoms vary in almost every case and are of value only in occasionally directing attention to the affected ear. Restlessness is often marked; crying is frequent; the lower jaw may present a peculiar tremor when the pain is severe; rubbing of the occiput against the pillow is not infrequent, while the restlessness is apt to be enhanced at night, specially if the ear has been discharging, then ceases with the extension of the inflammation to the deeper osseous structures. The temperature may be 104 degrees or 105 degrees and is of a vascillating character, especially when a discharge has been present, and suddenly diminishes. In the absence of such a local symptom, a rise of the temperature alone is of little value. But when examination shows, during the course of an acute otitis, evidences of retention, the presence of temperature is a valuable sign of mastoid infection. Unexplainable temperature in infants should always direct attention to the possibility of aural disease. As being indicative of aural trouble, the child often hangs the head toward the affected side, vomiting, convulsions and even coma may ensue. Deafness is a symptom generally impossible to determine at this early age. The pain is usually paroxysmal in character, growing worse at night, while during the day it is often for periods of time in abeyance. Some glandular swelling beneath the mastoid is ofttimes present and pain is elicited on pressure over the tragus.

"Often the sole evidence of the ear affection must be gained from a careful study of the child for several days, and thus ascertaining the character of the pain, the presence of septic symptoms which develop quite early after the mastoid becomes involved, and the changes which occur in the tympanic cavity. Torticollis in infants is very suggestive, as is also loss of weight without apparent cause. The development of mastoiditis is often associated with broncho-pneumonia. Often the condition is not recognized until edema becomes well defined over the mastoid, as spontaneous perforation may occur with the development of a fistula in cases where the mastoid cortex is very thin, even as early as a day after the onset of the acute attack. The presence of a purulent collection behind the auricle, is much more frequent in infants than in adults, on account of the aural conditions not being as promptly recognized in the former."

Treatment of Whooping Cough.—YOUNG (New York Medical Journal). The inhalation of the vapors of certain drugs, such as eucalyptus, creosole, carbolic acid (Phenol) or compound tincture of benzoin is sometimes beneficial. The nose and throat should be kept clean by sprays of salt solution, boric acid solution, solution of sodium bicarbonate or a solution of hydrogen peroxide in glycerine and water. Various antispasmodics are used, the best of which are asafetida, antipyrine, sodium bromide and belladonna. If we try one of these and do not succeed in reducing the number of paroxysms, we should try another. The mixture of asafetida may be given in twenty drop doses every two hours to a child of two years. Antipyrine may be given in two grain doses every four or six hours to a child of the same age. It is better to combine the latter with sodium bromide. Belladonna should be given in gradually ascending doses. We may begin with one drop of tincture every four hours in a child of two and gradually increase the dose until the physiological effects are noted. In the most severe cases, stimulants may be required, when we may use whiskey, brandy, or strychnia in appropriate doses. Tonics are useful in many cases, particularly during convalescence. Tincture of nux vomica is excellent if the appetite is poor. In poorly nourished children, especially those with a strenuous tendency, cod liver oil should be given. If the patient is anemic, iron should be given. An excellent preparation is the iron iodide. Complications should be treated as they arise and according to general rules. We cannot abort the disease. In some cases we may possibly lessen the number of paroxysms. Our main efforts should be to manage the case so that the dangerous complications and sequelae common to the disease shall be prevented.

Gummatous Synovitis Simulating Rheumatoid Arthritis in Congenital Syphilis.—J. W. Findlay, M. D., F. F. P. S. G., and J. R. Riddell, L. R. C. S. (Glasgow Med. Jour., Jan., p. 13). A girl, aged 9, came under observation on April 1, 1905. In infancy she suffered from snuffles. Two years before she was seen she began to suffer from pain and swelling in the right knee. Then the left knee became affected, and in the course of a few months all the joints of the limbs became more or less affected. The pain was always worse at night.

She had typical Hutchinson's teeth and interstitial keratitis. The frontal and parietal eminences and the occipital protuberance were unduly prominent. Both knees were swollen, the left much more than the right. In the latter the thickening appeared partly bony and partly synovial. The synovial thickening was well-marked, like "white swelling," on either side of the ligamenta patellæ. On flexion the knees creaked slightly. The right showed practically no limitation of movement, but the left was stiff and could be neither fully extended nor flexed by either active or passive movements. The hip-joints appeared to be normal. The ankle-joints looked thickened, but the joints of the feet appeared to be normal except the metatarso-phalangeal joints of the big toes, which were swollen, tender and painful, and creaked on being moved. The big toes looked unduly large. The shoulder joints were enlarged and in the left there were creaking and limitation of movement. Both elbow-joints were much swollen, especially the left, which was tender and painful and limited in movement. The wrist joints were swollen and the lower ends of the radius and ulna were thickened. The carpal joints were much thickened, especially on the right side, where the increase appeared to be due to bone. The movements of the wrist were much restricted. All the left proximal phalanges were thickened from increase in bulk of the soft tissues. All the right proximal interphalangeal joints and the fourth left interphalangeal were swollen. The metacarpo-phalangeal joints of the right thumb and index finger were thickened. The muscles of the shoulders and arms were small and flabby. The resemblance to rheumatoid arthritis was considerable, but skiagraphs showed no changes in the bones or cartilages.

For 18 months the patient had been taking syrupi ferri iodidi, and more lately potassium iodide also, but without appreciable benefit. For a month high frequency currents had been applied, and the diminution in the joint swellings and pains was so marked that in place of being carried to the hospital she walked with ease. A mixture of mercury and pot. iod. was prescribed, under which great improvement occurred.

Several forms of congenital syphilitic joint affections have been recognized. This case is an example of the one described by J. Hutchinson, jun., as "chronic synovitis with gummatous thickening of the capsule."

The Treatment of Fractures of the Femur in Infancy and Childhood.—Ware (Annals of Surgery). The writer describes a simple method of immobilizing these fractures, the origination of which he attributes to the late Dr. W. W. van Arsdale. A single strip of bookbinders' pasteboard, the width of which is adapted to the width of the thigh, is bent into a right-sided isosceles triangle, the free ends being joined by adhesive strapping. This splint is of such a size and is so applied (after padding and reinforcing with match board) that one side rests on the upper surface of the flexed and abducted thigh, whilst the side at right angles rests against the trunk. A muslin spica embracing the thigh and trunk secures the splint in position, and over this several turns of a dextrine bandage are placed to give additional security. The leg is left free to move.

It is claimed that the splint enables the patient to be comfortably carried about, dispenses with recumbency, is readily kept clean, and promotes perfect healing of the fracture. It is kept in place for three or four weeks.

Pathogenesis of Infantile Marasmus.—Bloch (Nord. Medicinskt. Arkiv.). The patients with infantile marasmus show practically no signs of gastro-intestinal disease. They take their food well, and appear to digest it well; there is no vomiting, and the stools are mostly normal. The appetite is unimpaired; the children lose weight and waste away.

The French have supposed that some intestinal intoxication is here at work, but no evidence for this view has been offered. Czerny, and later Keller, showed that marantic infants excreted abnormally large amounts of NH_3 in the urine, and attributed the marasmus to a general acid intoxication. But similar amounts of NH_3 have been found in the urine of apparently healthy children, and not all marantic infants show this excess.

Rubner and Heubner, and others, proved that the feces of such children contained large amounts of unabsorbed proteid and fat; the fact remained unexplained. Bloch, in 1902, showed that in three cases of the disease a pathological change in Lieberkühn's glands was present; these glands throughout the intestine were lacking in Paneth's cells, which are always full of secretion.

Bloch now adds details of three more cases of infantile marasmus. In the first of these the secreting cells in the stomach, pylorus, Brunner's glands, liver, and pancreas, were normal; but in Lieberkühn's glands the serous secreting cells (=Paneth's cells) were absent, their place being taken by cylindrical cells that were either empty Paneth's cells, or were cells of the same type as those normally present between Paneth's cells. In the second and third cases there was a slight chronic gastritis; the pyloric glands, Brunner's glands, Lieberkühn's glands (including Paneth's cells), and the liver cells, were all normal; the pancreas, however, while macroscopically normal, showed under the microscope normal ducts and Langerhans' islands, but abnormally clear translucent and non-granular pancreatic cells free from zymogen granules. Bloch produces reasons for supposing that these two are real cases of Achylia or Hypochylia pancreatica due to insufficiency (not atrophy or destruction) of the pancreatic cells. The first case and the three recorded in 1902 are cases of Hypochylia intestinalis.

Cerebral Abscess.—DR. BENJAMIN T. BURLEY (Boston Medical and Surgical Journal, April 5, 1906) reports an interesting case proven by autopsy. The clinical history is of a boy, seven years, who had a fall from a child's express wagon, striking his head on a brick sidewalk, on March 14. A hematoma over the right eye resulted. A week later vomiting and a convulsion of epileptiform type were followed by severe frontal headache, paroxysmal. These headaches became more constant. He was first seen April 7. At that time there was no evidence of injury. Temperature 99.2 degrees, pulse 60. Pupils normal in size, shape and reaction to light and distance. Slight photophobia. Heart, lungs, and abdomen normal. No marked disturbance of reflexes, sensation, or motor power. Kœnig's sign present. White blood corpuscles numbered 13,000. Four days later there were 18,000 whites, stiff neck and enlarged post-cervical glands. Temperature kept below 99.5 degrees, and pulse ranged from 48 to 60. April 13, ears and nose were found normal, but right optic disc was hypomanic. Next day spinal puncture gave 10 cc. of clear fluid, no cells, no bacterial growth. After this headache practically ceased, appetite returned, seemed much better.

Systolic murmur at apex not transmitted. Three days later pain and cerebral pressure symptoms returned and increased. Choked right disc, delirium, emaciation, weakness, and paralysis of the right third nerve, were followed by the Babinsky reflex on the right. After April 30 the right arm and leg were not moved. Blindness, rapid irregular heart, left tonic convulsions, opisthotonos without fever was the history till May 11, when the child who had been conscious and rational was seized by convulsions and died. Autopsy revealed an abscess 7 cm. in diameter reaching from the line of the mid-frontal lobe to within 2 cm. of the tip of the occipital lobe on the right side. There was no crack or fracture of the skull. No lesion of the cortex. Cultures showed streptococci in the necrotic tissue, but the meninges sterile. The case is interesting because there was no meningitis, no known source for infection, and a hemiplegia of the same side as the abscess. Operation, if done, would have been an opening into the left frontal region and would have done no good.

Stenosis of the Pylorus in Infants.—SCUDDER (Vermont Medical Monthly). The author maintains that this condition is much more common than is usually supposed; 55 autopsies and 6 operations are recorded. First there is vomiting. Usually it occurs soon after birth. It may not be till the third week. It is forcible, not regurgitation and contains no bile. Associated with the vomiting is visible peristalsis of the stomach, seen on the bared abdomen at the time of feeding. The stomach will be seen violently to contract, the wave extending from the left across to the right. Child is hungry. Pyloric tumor may be best felt as this peristaltic wave reaches the pylorus. Medical treatment causes 80 per cent. mortality. The best surgical treatment is gastro-enterostomy, done posteriorly to the colon.

The Control of Measles.—In his report on the Education Committee of the London County Council for the year ending March 31, 1905, Dr. Kerr, under the heading Measles, says: Measles is the most fatal disease of childhood, and the one which plays the greatest havoc with school attendance. Two months after my appointment the late School Board approved of a scheme for a thorough inquiry in a limited area, to extend over about five years. The area selected was Woolwich, and the medical officer of health has co-operated, so that the measles history of each child is kept on a card from the day of its entering the infant school. In one-half of this district it has been attempted to suppress every appearance of measles by rigorous class closure; in the other half individual exclusion is followed, and the schools are not closed if this can be avoided. The inquiry began in the autumn of 1902. It was soon found that 50 per cent. of children had already had measles before coming to the Infants' Department, and 84 per cent. had it before passing out of the infant school. These figures will, of course, vary considerably according to whether the disease has been recently prevalent or not. The cards show at any time the susceptible material present in each class. During the following year each outbreak was followed as well as possible, and the conclusion arrived at that the only successful cases of closure depended on closure on the appearance of the first case in a susceptible class, and experience showed that closure for measles, which hitherto had only been resorted to as a panic measure when the disease becomes prevalent, is, under such circumstances, of no avail. The necessity for the prompt notification of every case of measles became apparent, and the fact that where the head mistresses had special knowledge they prevented the spread of the disease in their schools, which suffered much less than the other schools. Now, during the past year increasing duties have made it more difficult for Dr. Thomas to follow up this work, but he has had the aid of a sanitary inspector, and each school has had the measles cards duly filled in. The individual outbreaks have been analyzed, and as Dr. Thomas has spent much time on the study of these outbreaks and the effects of school closure, his detailed report is so much worth careful study that it is printed *in extenso* as an appendix. The generation we began with has not yet been followed through the infant school, but already much valuable information has been gathered. The inclusion of all the non-provided schools will help to remove an unknown factor in the districts under examination from the results yet to be obtained. The teachers have now become educated to the value of the inquiry, and during the past year the card records are believed to have been fairly reliable. In the first outbreak detailed in 1904, that at Purrett Road, it is shown that 77 per cent. of the 57 per cent. unprotected were affected. It also shows the necessity of closure on the occurrence of the first case, closure at the appearance of the first "crop" being ineffective. Closure during the holidays at Easter did not prevent the dissemination of the disease out of school at Eglinton Road; at the same time, closure as usually applied would have appeared to have stopped the disease here, when in reality it would not possibly at the best have prevented 7 out of the 57 cases. Without any closure one or two cases appeared in every class at Burrage Grove without further extension, and at Maryon Park, where the cases were carefully gone into, 36 out of 115 could be definitely decided as infected out of school, one little maid of 5 being responsible for 11 out of school cases. Union

Street, Mulgrave Place, and Conway Road give good examples of how an intelligent head mistress, with hygienic instincts and training, protected even babies' classes. One very unsatisfactory case, from our point of view, was a child of 5 from a guardian's home, where, through mismanagement or ignorance, cases of measles appeared to have been treated whilst others attended the schools. This child, in spite of prompt and energetic measures, may be said to have caused at least 207 known cases in four schools, necessitating fourteen separate closures of rooms, or exclusions of non-protected children.

The almost explosive outbreaks at Deansfield Road and Timbercroft Road illustrate the evils of ill-ventilated and insanitary temporary buildings, and the necessity for increased floor allowance in these as compared with permanent buildings. The balance of evidence preponderating in favor of closing is yet doubtful, even when the closure is applied at the earliest opportunity; later it is quite futile. Early closure involves closure on false alarms; then, again, the more successful it is the oftener it has to be repeated, and this interferes materially with educational progress. Dr. Thomas states from the Woolwich experience that in towns measles will spread in classes where one-third are unprotected, and will recur until the unprotected are reduced to one-fifth. School closure for measles can never take the place of teachers especially trained in school hygiene, imbued with the ideals that constitute a "sanitary conscience," and working in good hygienic surroundings. Probably exclusion of non-protected individuals will be the ultimate solution of the attendance problem in face of a measles outbreak, and it is very doubtful whether exclusion of children, themselves unaffected but coming from affected households, is required in any except the infant departments. The inquiry made by Dr. Thomas in the Woolwich district brings out so many important and interesting points in the history of measles, we give Dr. Thomas's conclusions. In an opening paragraph this officer says: The inquiry into the spread of measles has been continued in the Woolwich district with the co-operation of Dr. Davies. Particular attention has been given to the incidence of cases in school outbreaks amongst the age groups, and amongst the protected and unprotected; it has been possible to do this with increasing certainty and facility since the teachers are becoming accustomed to the measles-history cards, and throughout the division practically every child now in an infants' department has had its measles history entered upon admission to the school. Then follow analyses, accompanied by diagrams, of outbreaks of measles in a number of the Woolwich schools. These are all interesting as showing cause and effect, and may be studied with advantage. Dr. Thomas writes: The reliability of the histories of measles obtained on admission of children to school is a most important consideration. It has previously been pointed out (in the First Annual Report, 1903) that the similarity in the curves of the various schools, and the regular increase of the proportion of the children who have had measles as we pass from the age of 3 to that of 8 is strong presumptive evidence of the very considerable reliability of the histories. We may now apply a test from the facts gained by experience; this test depends, however, upon the amount of protection given by a previous attack of measles. Most observers agree that one attack protects the individual to a very considerable degree, probably in by far the greatest majority of children the protection is absolute; but it is doubtful if a single observer would say this is invariably the case, and most medical men will assert they have seen second attacks. Let us assume, however, the position that the protection given by a first attack is absolute, and any second attack reported proves that the history of the first attack was an error. Out of 627 cases of measles, only 48 had been reported to have had measles before, or 7.6 per cent. If we take the outside view that all the second attacks were children wrongly reported in the first instance, we have the error as 7.6 per cent. at the greatest. The probability is that the error is much less, and this is borne out by the successful cases of individual exclusion, to which reference will be made later. Assuming that all the histories were correct, the second attacks would work out at 7.6 per cent.; they are probably, as has been explained, less than this. In the case of Union Street the child who undoubtedly set up the disease was reported to have had measles before, and had been seen by a doctor, both before and upon this occasion; although there is not the least doubt that she carried the infection into school, yet no rash was seen upon her by the doctor or the mother; she had the coryza simply, and got pneumonia because the complaint was treated lightly and she was allowed to go out with inflamed bronchial passages. It is possible, therefore, that a person who has once had an attack may suffer from a slighter attack of true measles in which no rash appears; such a phenomenon is known in scarlatina and in small-pox, and there is no reason why it should not occur in measles; however, the question must remain open at present, but even if it does occur it must be so rare as to be negligible as a factor. Another case of interest in this connection is one which occurred at Conway Road on May 27, 1904. Lilian L. was absent at the time a crop of measles was expected in the class. I visited her, and found she had a temperature, a cough, suffusion of the eyes, and Koplik's spots were present in the mouth, yet no rash appeared. The mother watched carefully, and I visited on several occasions, but no rash was to be seen. She was said to have had measles before. Another child in the same class at the same time, Daisy H., aged 6, under precisely similar circumstances, in addition to the same symptoms, had a very fleeting measles rash which might almost have been passed by unnoticed; she also had had measles previously. An examination and comparison of the results in the closing and non-closing halves of Woolwich shows that the percentage of unprotected cases attacked varied from 13.2 per cent. to 90 per cent. in schools where closure was resorted to at the earliest opportunity, and from 22.5 per cent. to 62.6 per cent. in schools where no closure was carried out. Amongst the former class, however, Timbercroft Road, with 81.5 per cent., and Deansfield Road, with 90 per cent., are temporary buildings. Excluding these, we still have Ancona Road, giving 41 per cent., the "Slade" 50 per cent., and Purrett Road 65 per cent. of cases—a range higher than the average of the non-closing schools. In these schools, however, the actual first case was missed, and closure only took place on the occurrence of the "first crop." In Earl Street and Vicarage Road, where earlier knowledge was obtained, they suffered to quite as great a degree during the year as in the average of non-closing schools, while at Conway Road, in which alone any striking difference is met (only 13.2 per cent. suffering), every other condition combined to arrest the spread, and the very low proportion of susceptible cases in attendance (26 per cent. of the whole) diminishes the value of the experience as a test of class closure—although here it must be evident that closure of classes helped. In all these schools, however, measles tended to break out again and again, until the proportion of children was reduced to a certain degree (down to 25 per cent.), and this necessitated an amount of class closure which was ruinous to orderly and continuous education, some classes having to close as many times as thrice in six months, and many closures took place, both at these and other closing schools, owing to false alarms. In the non-closing schools, on the other hand, only at Maryon Park is any untoward amount of measles to be noted, and here it is seen that a very large proportion of the children were unprotected (53 per cent.), which fully accounts for the excessive number of cases, which even here does not reach the percentage which was reached at Purrett Road. It will be seen that this year's experience, therefore, does not show any great preponderance of balance in favor of closing, even when closure is applied at the earliest opportunity. Under present urban conditions measles will appear in a school and spread when the proportion of children unprotected exceeds a third of the whole number, and will not subside until the proportion is reduced to a fifth of the whole number. One thing certain is that closure can never take the place of good hygienic school conditions and its corollary, teachers especially trained in school hygiene with well-developed sanitary consciences. An examination of the table shows that measles in general may be expected to appear and spread in a department when the number of children unprotected reaches about 33 per cent., and that usually, except where special conditions obtain, it ceases to spread when the proportion is reduced to 18 per cent. The enormous value of healthy surroundings in school is shown by the fact that *ceteris paribus* the lighter, the airier, and the less crowded a school the less is the spread of measles. In the two temporary schools of Timbercroft Road and Deansfield Road, in spite of closure at the very earliest knowledge of a single case of measles having occurred, we have the curious and melancholy parallel of 81.5 per cent. and 90 per cent. of the children unprotected attacked, and only 5.5 per cent. and 4 per cent. of total children left who have not had measles. These temporary buildings are incapable of even fair ventilation (I have found 30 parts per 10,000 of CO_2 in one), of proper warming or hygienic class arrangement, and in view of the experience here gained it would be well to insist upon a higher area of floor space per child than in permanent schools, while there can be no doubt that the minimum of floor space per child in all infant schools should be at least as great as in the older departments. We have seen that unless the very first case of measles in a susceptible class is noted and reported closure of the class fails to arrest the spread of measles, so that even here the attitude of the teacher is of prime importance. It is unfortunate that a penny wise and pound foolish attitude has been forced upon teachers from outside, and when imbued with the ideals of increasing their average attendance by every means in their power, the rough and ready principle of accepting and retaining every child regardless of the condition of its health is prone to prevail in spite of its short-sighted nature. In schools driven on this plan much spread of disease is inevitable. When, however, as fortunately often obtains, the teacher, in spite of opposition, insists upon being governed by the higher ideals which we are learning to designate as the "sanitary conscience," measles is likely to spread to a much less degree, and where this conscientiousness is united with special knowledge and training in school hygiene it is probable that we have the greatest safeguard against the spread of disease it is possible to have, and where this is combined with the best hygienic surroundings it is probable that the conditions would be more effective than school closure in confining outbreaks to their smallest dimensions. Usually the secondary attacks arising from a single case occur in more than one class-room, and the ideas obtained from a static survey of the isolated arrangement of class-rooms break down in view of the dynamic methods of infant school organization, in which sections of classes are combined for various purposes. It is probable, however, that in well-ventilated and organized schools the spread takes place more outside school hours than in the actual school-rooms where the children are under constant supervision. Thus at Maryon Park the infection spread from babies, not to babies, but from babies to the older children whose duty it was to superintend the comings and goings of the babies. Dr. Thomas states that the general conclusions which the inquiry seems as a whole up to the present to justify are: 1. Measles at present in London only spreads in classes under 5 years of age, except in certain better-class districts. Seventy-five per cent. of children above 5 in infants' departments are protected. 2. Measles tends to spread whenever a class accumulates unprotected members to the extent of between 30 per cent. and 40 per cent., and when spread has begun it continues until the proportion is reduced to between 15 per cent. to 20 per cent. unprotected. 3. If children under 5 were excluded from school, closure for measles would not be necessary for some time in London, except in one or two special districts; if, however, this were successful in postponing attacks, the question would again become acute in a few years. 4. To deal efficiently with measles accurate knowledge is required; the measles history should be elicited for each child on admission to school. This should be done universally; if notification to school authority was made compulsory on every parent whose children attended school, our hands would be greatly strengthened. Unless the amount of susceptible material is fairly accurately known for each school, we shall only be working in the dark, as heretofore, and nothing of any value can be expected to accrue from our methods. 5. To effect any useful purpose, school closure must take place before the "first crop" falls. The old practice of waiting until the attendance fell to a certain limit was useless in arresting the spread of measles, and did absolutely no good. 6. The means of arresting spread of measles other than school closure are of enormous importance. To name two—sanitary buildings and training of teachers; these two factors probably have the greatest effect of all in determining the extent of spread of an outbreak. 7. Deaths often occur from ignorance on the part of parents. Circulars should be sent out wherever measles has appeared in a class—that is, on the incidence of the first case—begging mothers to notice colds, and upon the slightest suspicion of such symptoms to keep the child at home for a day or two. In this way measles would probably be checked to a far greater extent than has been effected by any other means. Instances have come to our notice where heartbroken mothers have stated that, had they known, they would have treated colds seriously of which they took no note, and thereby their children's lives would have been saved. I suggest that circulars be thus used during next year in Woolwich. 8. Measles never spreads in the boys' and girls' departments. There is no need to exclude children from infected homes who attend the upper departments. As a result of our inquiries, this has actually been carried out at Brighton, with satisfactory results. 9. There is too great a tendency to look at things from an "attendance" standpoint; this is one of the greatest evils with which we have to contend. The withdrawal by the Board of Education of Article 101 was the greatest piece of official folly ever perpetrated. If a whole department is closed the average attendance is not affected; but if on the score of health a single class is closed by order of Sanitary Authority, or by the Council's Medical Officer, it is supposed that the attendances are missed, and the effect upon the average attendance and consequent grant is enormous. We thus have great difficulty in carrying out our measures, as much opposition is often encountered to the necessary closure of a single class, while the unnecessary closure of a whole department is gladly borne or even welcomed. 10. This is an economic question which is not one of health at all; and when attendance has fallen to a certain percentage at which the loss of grant is so severely affected, the department should be automatically closed independently of the question of health. This percentage ought to be worked out.

Central Ataxia in Childhood—A. W. FAIRBANKS (Journal A. M. A.). The author discusses the condition occasionally observed in children characterized by muscular incoördination, delayed voluntary muscular action, unsteady gait, slow or hesitating speech, occasionally explosive, nystagmus, tremor, involuntary movements, choreiform or otherwise, deficient energy and later paralysis, muscular spasm and contractures. Other less characteristic symptoms are vertigo, headache, optic atrophy, pupillary anomalies, various mental and sensory symptoms, trophic changes in muscles and more rarely sphincter weakness and cutaneous trophic changes. some of these symptoms are later than the others, and may mask the earlier symptoms of the disease. Fairbanks thinks tendon reflex anomalies are simply a matter of duration or extent of the central lesion and not essential to the symptom complex. The variations from the original type of Fredreich are remarked, and the author refers to the cases reported by Everett Smith, Nonné, Menzel and Sanger Brown as most typical and interesting of the type here discussed. In the autopsies that have been made nearly all the subjects showed extreme degeneration of the posterior parts of the cord and th posterior nerve roots were more or less degenerated in all. In all but one case there was some atrophy of the medulla and cerebellum and atrophic changes in certain of the cranial nerves. The pathology of the condition is discussed, and he points out that the latest formed portions of the cord are the seat of greatest degeneration. He thinks that the defects indicate a process supervening on a developmental insufficiency, either of structure or inherent vitality of the nervous system. In Nonné's anomalous case there was general smallness of the entire nervous system without special signs of degeneration.

Rupture of the Aorta, and Arteriosclerosis During Childhood.—Oppenheimer (Virchow's Archiv). The author reports two cases of arteriosclerosis in children aged 9 and 10 years respectively. In the first case, without preceding traumatism, a longitudinal tear measuring three inches was found in the intima and media of the aorta, one-half an inch above the line of closure of the valves. At one point this tear presented a perforation into the pericardium, from which a fatal hemorrhage had taken place. Two other arteriosclerotic plaques were found to be present. The author seeks the point of origin of the disease in the media, for the reason that the elastic fibres of the media were found to be extensively torn in portions of the aorta which were microscopically intact. No primary inflammatory process of proliferation existed in the intima or adventitia. In the second case, of simple arteriosclerosis, the media was normal, whereas cellular infiltrates occurred in the surroundings of the nutrient vessels.

A Contribution to the Study of Nasal Diphtheria in Scarlet Fever.—Uppenheimer (Münch. Med. Wchschrft). A male child of 3 years sickened under manifestations suggestive of mild diphtheria. At the end of a few days the typical eruption of scarlet fever developed, and extensive fibrinous membranes formed in the nose. These were discharged together with a muco-purulent secretion. Besides numerous colonies of streptococci, cultures made from the membranes showed only a few isolated Klebs-Loeffler bacilli. The author accordingly interprets the formation of membrane as a part of the scarlet fever process, and ascribes it to the activity of the streptococcus.

Family Transmission of Tuberculosis During Childhood.—COMBY (Archives de Médecine et Chirurgie des Enfants). According to the author, in early infancy tuberculosis is most commonly, if not exclusively acquired by contagion in the falmiy. Heredity, transmission from mother to fetus, is only apparent as a rule, and certainly constitutes a very exceptional occurrence. The principal mode of entrance, and the only one possessing practical importance, is by way of the respiratory tract. The bronchial glands are invariably involved, the remaining localization being secondary and infrequent. Intestinal tuberculosis is always secondary, and never primary. (?) The author observed caseation of the lymph glands in infants of forty and fifty-six days of age; but it is not generally met with before the third month. A predisposition for tuberculosis is not shown by any subjective or objective sign during infancy and early childhood.

Focal Softening in the Medulla in Diphtheria.—R. B. WILD (Med. Chron., June, 1905). A boy, aged 14 years, died from what was supposed to be a rapidly progressive diphtheritic paralysis about three weeks after a mild attack of diphtheria. The autopsy showed congestion of the brain which was soft in consistence; there were several white tubercles at the bifurcations of both Sylvian arteries, but no signs of meningitis. The floor of the fourth ventricle presented a patch of grey softening, 1-3 by 1-4 inch; it was about half-way down the ventricle, on the left side, and it extended in depth nearly 1-4 inch, having in the centre a distinct bright red hemorrhagic focus. The rest of the brain was normal. The lungs were congested, and there were a few old pleural adhesions. The other organs were normal, and the vagi and phrenic nerves showed no degenerative changes.

Early Paget's Disease.—INGELRANS (Bull. de la Soc. Centr. de Méd. du Nord, p. 161, 1905). The disease first appeared when the patient was ten years old. The one tibia became elongated, flat, and curved; there was compensatory curvature of the spine. The tibia was tender, with absence of all signs of chronic osteomyelitis and rickets, the condition being due to early Paget's disease, affecting one bone, and is further proof of the identity of this disease and hereditary syphilis of bone. Similar cases are quoted from Lannelonge, Charmeil, and Raviert.

PEDIATRICS

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ORIGINAL ARTICLES

SCALP ISOLATION AS A NEW TREATMENT FOR SCHOOL RINGWORM.[1]

By David Walsh, M.D.,

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Ringworm is essentially a school disease. Not only is it highly contagious, but owing to the peculiar ways of children it is extremely liable to be conveyed from one to the other. By some mysterious law of nature the playful exchange of caps seems to be a never-ending source of amusement to children. In addition to being highly contagious, ringworm is, generally speaking, a lingering and rebellious complaint. The majority of cases may be cured by skilled treatment within six to twelve months, but others take two or three years or more. In one case mentioned by Aldersmith, the disease lasted for no less than seven years. Ringworm, moreover, is often difficult to detect, and unrecognized and unsuspected cases are always found in investigating school outbreaks. It is no less difficult in many instances to say when a case is definitely cured, and many children are sent by their parents back to school with the disease in an active condition, after having undergone a short course of treatment at a special hospital.

From the foregoing facts it follows that ringworm is a serious malady, especially when we take into consideration the interruption to education that is involved under existing conditions. No responsible medical man could sanction the attendance at school of a child suffering from ringworm. As a matter of fact the disease is common among Poor Law and Council and Board

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[1] Brit. Jour. Chn's. Dis.

Schools, whereas it is comparatively rare in the private and public schools of the wealthier classes. This shows that the prevalence of ringworm is mainly a question of environment. Indeed, were it not for the merciful dispensation of Providence, which ordains that ringworm practically dies out at about 15 years of age, the complaint would be more or less universal at all ages among the poorer classes of the United Kingdom.

In spite of the difficulties that surround the problem of prevention there nevertheless underlies all our investigations the comforting conviction that ringworm being a preventable disease it will some day be surely prevented.

One of the chief obstacles in dealing with ringworm lies in the fact that hitherto no method of rapid and certain cure has been discovered by medical science. A host of remedies have from time to time been vaunted as "certain cures" for the disease. Among these may be mentioned chrysarobin, glacial acetic acid, blistering thymol, salt, croton oil, metallic oleates, biniodide of mercury, formalin, tincture of iodine, the X-rays, and many others. In spite of the long list of remedies no royal road to the cure of ringworm has yet been found. All of the remedies mentioned will cure some cases rapidly, but none of them will cure all cases while in a few instances all of them fail altogether. In practice, remedies may be divided into those which act by virtue of their direct germicide powers and those that act indirectly by exciting a reaction in the surrounding tissues. The new method shortly to be described aims at a combination of the direct and indirect methods, with a local means of isolating the actively contagious scalp.

In the Metropolitan Poor Law Schools the ringworm children are now classified and kept apart in special schools, where treatment can be carried out without interfering with education. In the County Council and elementary schools of the United Kingdom isolation of that kind would be impossible. The only alternative plan of ridding those schools of the disease under existing methods would be to exclude all affected children from attendance by skilled medical inspection. As Aldersmith points out, such exclusion would in the majority of cases mean practically the loss of the whole school life. The prevalence of ringworm in some County Council Schools must be simply appalling, if we may judge from the numbers of such children brought for treatment to special hospitals for diseases of the skin. It is impossible to get exact statistics. In 1894 Aldersmith and Abraham examined about 600 children from two London Board Schools, and found only 3 per cent. suffering from ringworm. That percentage, however, can hardly be accepted as representing the average prevalence in such schools, for Aldersmith, between the years 1887 and 1896, rejected 4.3 applicants to Christ's Hospital, a middle class school, on account of ringworm. Moreover, when an outbreak occurs in a public school of the higher class, more than half the scholars have been often attacked. Now that a medical officer has been appointed to supervise the County Council scholars, exact details as to the prevalence will shortly be forthcoming. Dr. Ker, however, has not held the office in question long enough to be able to furnish those particular statistics. As things stand, affected children are treated either at home by private practitioner or at hospital. In either case the parents are required to produce frequent medical certificates of exemption to the school attendance officers. The result of this pressure and of the ignorance of schoolmasters and of school attendance officers no less than of parents is that many of the children are sent back to school in an uncured condition, where they once again become active centers of infection.

Medical authorities are agreed that every case of ringworm, however slight, should be at once isolated. Surely, in face of that opinion, it becomes the bounden duty of the London County Council and all other education authorities throughout the kingdom, not only to weed out cases of ringworm from their schools, but also to take every possible precaution to prevent affected scholars from returning.

Yet the problem of how to deal with school ringworm, although beset with difficulties, is not without a ray of hope. Although we cannot isolate school schildren suffering from ringworm, it is nevertheless possible to isolate their scalps. The mountain may not come to Mahomet, but Mahomet may still go to the mountain. It stands to reason that if we can encase the shaved scalp in an impervious envelope or cap we shall, for the time being, prevent the spread of infection from that particular scalp.

The method may be described in detail somewhat as follows:

The scalp is first shaved, no matter whether there be one patch of ringworm or many; it is then rubbed with turpentine, washed with soap and water, and dressed thoroughly with a germicide, such as a weak solution of formalin or sulphurous acid. It is then exposed to the X-ray tube for ten minutes, and finally painted with several coats of a 10 per cent. solution of salicylic acid in flexile collodion. X-ray exposure, however, is not indispensable, and a mild irritant remedy may be substituted. In the next few days a fresh coat of collodion is applied, especially if there is any tendency to crack in the film or collodion-cap. If desired the cap-film can be strengthened by a coating of rubber solution, by Unna's zinc gelatin, by fastening on a thin layer of cotton wool or by strips of rubber adhesive plaster. After a week or ten days the whole cap-film is forced up the eighth of an inch or so from the scalp by the growth of the healthy hair. The loosened film can then be gently stripped away bearing on its under surface the firmly adherent stumps alike of diseased and of healthy hairs. In short a wholesale depilation has taken place, especially if the X-ray dosage has been accurately administered so as to loosen the hair bulbs. The cap-film, if it cannot be stripped off without causing too much pain, may be made easier of removal by inserting a pair of curved scissors between the film and the scalp and snipping through some of the hairs. The shaggy under surface of the separated cap-film is remarkable. The ringworm hairs are twisted and irregular, as when they were on the scalp, and some of them are often turned white presumably by the action of the ether in the collodion. The process may be repeated as often as may be deemed necessary. In cases where large areas of scalp have been denuded in this way the hair has later grown again vigorously, so that there need be no fear of permanent baldness.

Collodion is somewhat costly, but no doubt many cheaper substitutes, such as rubber solution, could be found.

The essential points about this new method are the general depilation of the scalp after the hair bulbs have been loosened by exposure to the X-ray tube by means of a cap-film of some adhesive substance, whereby isolation of the infectious scalp is at the same time effected. Various experiments show that it will be easy to contrive cheap and efficient substitutes for the collodion film.

The advantages of the combined cap-film method of treatment ringworm are the following:

(1) Infection of other children is prevented by isolation of the individual scalp.

(2) Cure is hastened by the depilation of diseased and of healthy hairs.

(3) The depilation of diseased stumps is effected by an extremely slow but powerful traction upon a bulb loosened by the application of the X-ray or by some mild irritant remedy.

(4) The method combines direct and indirect curative measures with isolation.

(5) The X-ray if wished, can be applied through the cap-film.

(6) The children affected with ringworm can attend school if their scalps be thus isolated.

(7) Treatment need not be applied oftener than once every week or ten days.

In conclusion it may be remarked that under this or any other plan success in stamping out school ringworm can be attained only by the help of skilled and systematic medical inspection. Without such aid it would be impossble either to detect cases or to treat them properly, or to say when they are cured. The special cap-film treatment would have to be carried out, say in London at a central station under the control of a medical man experienced in ringworm cases. Its chief claims are that while it materially shortens treatment it effectually prevents the spread of infection and permits the education to go on unchecked. The London County Council will doubtless rise to the occasion and before long organize a method of ridding their schools of ringworm. It may safely be predicted that sooner or later public opinion will insist upon the adequate and scientific treatment of this preventable evil that now scourges the juvenile population of the United Kingdom.

X-RAY TREATMENT OF RINGWORM[1]

By F. Gardiner, M. D., F. R. C. S.

When a marked case of ringworm affects a child's head the physician is face to face with a condition which, in spite of assiduous attention, may take years to remove; on the other hand, the same disease affecting the glabrous skin yields often to the application of even the mildest domestic remedies.

Sabouraud's record of successes was at once hailed with joy, especially as the treatment by converting the skin of the scalp into the condition of the general body surface seemed eminently rational.

Aldersmith[1] points out that in 1893 he stated that the cure of ringworm rested on a means of producing temporary alopecia. He uses a saturated solution of boric acid in spirit and ether, which is kept applied constantly by soaks. Recently he narrated a case where, in eleven weeks, cure followed this treatment when applied to a microsporon affection.

Depilatory powders, such as—

Barium sulphide
Zinci oxidi
Pulveris amyli—ana partes æquales

have been used similarly, and are still used in certain cases in the skin clinic in the Edinburgh Royal Infirmary.

These and other methods, however, do not attack the disease at the roots of the hair, and as X-rays produced complete epilation the outlook seemed more hopeful.

The claim of priority might well be made for Edinburgh Skin Department, as it has been made for many other individuals and institutions, but to Sabouraud[2] must fall the credit of putting X-ray treatment of ringworm on a scientific basis or at least taking the first steps towards scientific accuracy.

His technique is as follows:—

Using a static machine as the source of electricity, he encloses a Chabaud X-ray tube in a metal case with an opening towards the patient's head. Into this opening cylinders of varying diameter (to suit different areas of disease) are fitted, and their length is such that the patient's head is 15 cm. from the anode. The spark gap is less than 10 cm. and at a distance of 7.5 cm. is fixed a pastile of barium platino-cyanide, which will have assumed a definite tint when the requisite dose has been given, *i. e.*, it changes from a greenish yellow to a fawn color. On the seventh day slight erythema appears, and two weeks later all the hair has fallen out. From the day of the operation, while waiting for depilation, an oil of cade ointment is applied to the whole head every evening—

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[1] Scot. Med. and Surg. Jour.

Oil of cade, 10 gram.
Lanoline, 25 gram.

and is washed off with soap every morning. After the morning washing the whole head is treated with—

Tincture of iodine, 10 gram.
Alcohol, 60 per cent., 90 gram.

This is to prevent the hairs, when they fall out, infecting healthy and untreated regions, as the X-rays do not kill the fungus.

It takes other two months till the hair grows in again, and "whereas ringworm was formerly cured in two years, it is now cured in three months or freed from infection in one month;" and, to continue the translation, "an average cure costs 260 francs, and formerly cost 2,000 francs." Unfortunately, results in this country do not follow with such mathematical precision, and from all sides reports of failures have been recorded and new methods of measurement and modes of procedure have been suggested.

Sichel[3] roughly estimates his successes at 50 per cent., and in only 1 per cent., did a dermatitis and permanent baldness ensue.

Oram[4], out of 108 cases, records 47 cures and 11 failures, 15 are still under treatment, and the rest have been lost sight of.

Batten[5] in 25 cases has had 1 case of mild dermatitis and 3 failures.

In dealing with hospital cases, as the last-mentioned writer observes, insufficient attention to cleanliness is a frequent source of failure, private patients being more successfully dealt with.

The protection of the rest of the head is an important matter, and is attained in Sabouraud's method by the metal cylinder. Others use cylinders of leaded glass, but most use lead foil with holes cut opposite the affected areas. Batten used a boy's cap coated with white lead.

Before treatment, all the hair should be closely clipped, as many unsuspected spots are then frequently found.

If the whole head has to be denuded, four or five exposures have to be given from various directions, avoiding overlapping of the dose if possible. Smaller areas are best marked out by iodine or a blue pencil. Some workers still use repeated exposures of ten minutes' duration, as they consider it safer; but many patients, especially coming from a distance, will object to this, more especially if they hear of only one exposure being successful in other cases. In spite of this, however, if one long exposure fails, it is safer to start again by using several shorter exposures.

Walsh[6], with a view to prevent infection in schools, has recommended the following as a routine practice:—

"The scalp is first shaved, then rubbed with turpentine and washed with soap and water and dressed thoroughly with a germicide, such as a weak solution of formalin or sulphurous acid. It is then exposed to the X-ray tube for ten minutes, and finally painted with several coats of a 10 per cent. solution of salicylic acid in flexile collodion." This cap is strengthened if necessary by gelatine or rubber, and after a week or ten days it can be pulled off, and the process is repeated twice or thrice. He claims that the advantages of the combined cap-film method of treating ringworm are the following:—

1. Infection of other children is prevented by isolation of the individual scalp.

2. Cure is hastened by the depilation alike of diseased and of healthy hairs.

3. The depilation of diseased stumps is effected by an extremely slow but powerful traction upon a bulb loosened by the application of the X-rays, or by some mild local irritant remedy.

4. The method differs from all hitherto devised, inasmuch as it combines direct and indirect curative measures with local isolation.

5. The X-ray, if wished, can be applied through the cap-film.

6. The children affected with ringworm can attend school if their scalps be thus locally isolated.

7. Treatment need not be applied oftener than once every week or ten days.

8. In large towns, affected children could be brought to a central station for treatment by an expert.

Where one treats by means of one exposure, as Sabouraud suggested, one may summarise the possible causes of failure under two groups—

A. Imperfections in the method of application.
using a similar voltage and amperage.

B. Variations in the patient and the type of the disease.

Under group *A* the following particulars have to be considered:—

1 The source of energy varies with different observers—a different voltage and amperage being used.

2. Coils and static machines vary in their output.

3. Alterations in the rapidity of interruption cause alterations in the output.

4. Authorities differ as regards the requisite hardness of tube.

5. The X-ray production from a tube varies from minute to minute and day to day.

6. The milliamperage going through a tube is not an absolute test.

7. Sabouraud's pastilles are mostly considered unreliable, although Adamson[7] considers them perfectly accurate. Others writers mentioned in this résumé all take other views.

Under group *B* may be classed the following:—

1. There is an idiosyncrasy on the part of certain patients.

2. In the case of a child there is a difficulty in keeping the head absolutely steady:

3. Granting even that the hairs are loosened, many lie loose in the follicles in certain cases and do not come out.

When one considers all these factors that make for failure, is it small wonder that uniform results have not been obtained? How to rectify this must be our object, and faults due to group *A* can probably be minimized by careful observation.

It is imperative that the apparatus should be under the careful—at least periodic—supervision of the physician, who with long experience can often get nearer the true dose by a look than can the tyro with all the measurements available to him. Schiff, we understand, relies on this plan chiefly.

Every apparatus has, if one might use the phrase here, a personal equation which it is very desirable to ascertain, the hardness of the tube, milliamperage passing through, and fluorescence being here doubly valuable as tests.

Macleod[8] has recommended the use of a speed-counter for the interruption, and as an adjunct it may be useful. He uses a tube giving 3 to 4 degs. of penetration on the radiometer, a spark-gap of about 10 cm., and a current of 2-5 of a miliampere, and gives about 16,000 interruptions of the primary circuit. Other observers measure by the time, somewhere about 20 minutes, and it is as well to control with Sabouraud's pastilles. In all cases the tube must be watched during the exposure and softened if it gets too hard. The Chaubaud or the Hirschmann regulating tubes are very useful for this purpose.

Group *B* will, we fear, prove a permanent source of trouble. It is true that many deny the idiosyncrasy of the patient, but one sees it frequently in X-ray treatment of other conditions; and, after all, one might rationally expect it, seeing it is universally recognized that different skins react differently to various irritants.

To secure the removal of loose hairs lying embedded in their follicles, a nail-brush and general massage is helpful, but as often there is no projecting stump, it is at times ineffectual. Luckily, it is not a condition invariably present, and where absent the prognosis is more hopeful.

By the loosening of diseased hairs, the risk of spreading the affection is increased, and, as has been mentioned, punctilious washing and rubbing in of antiseptic ointments is an essential.

Ordinary soap and water does very well, but if preferred, soap-spirit may be used. Batten uses a 1 per cent. resorcin lotion. As regards ointments—

Sulphur precipitate
Hydrarg. ammoniati AA ʒi
Vaseline ad. ℥i, or
10 per cent. oleate of copper, or
2½ per cent. salicylic vaseline with ammoniated mercury,
ʒi to the ℥i of vaseline

may be mentioned.

Dore[9] rightly states that a pustular eczema and even seborrhea may be left behind which stimulates the original disease, but in every case a careful microscopic search should be carried out.

We may seem to have been too pessimistic in this résumé, but when the worst is said there still remains the fact that the treatment is much more expeditious than any we have yet used. Further the risk of a permanent alopecia is slight, and if the treatment otherwise is a failure, no harm results, as the usual methods are being followed at the same time.

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THE X-RAY TREATMENT OF RINGWORM[1].

By Gerald Sichel, F.R.C.S.

For some months past Sir Cooper Perry has sent the majority of the cases of ringworm and parasitic alopecia from his out-patients and elsewhere to me for treatment.

Up to December 7th, 1905, I have had 102 patients; of these 67 still remain under observation, for I presume that no case can be conscientiously discharged until the hair has not only fallen out but has also shown considerable regrowth free from disease.

In a poor out-patient practice also a great number of patients, for various reasons, do not attend regularly, so that probably a large percentage of these 67 cases will never be seen again.

Of the remaining 35 cases, 30 were ringworm and 5 alopecia areata. Of the alopecia areata cases 4 are recorded as cures and in 1 case hair was just beginning to grow, but the patient did not attend again to be seen.

Of the 30 ringworm cases, 11 were cures, 10 were failures, and 9 patients ceased to attend before a definite result could be pronounced.

Among the 102 cases I have had one case of *x*-ray dermatitis, still under observation, which I am afraid will result in permanent baldness. I regret to say that this case occurred, not among my earlier but among my very latest patients. I venture to think that an unfortunate mishap like this, occurring towards the end of somewhere about 100 cases, vividly illustrates the danger with which this method of treatment is accompanied.

Of my 30 cases of ringworm which I look upon as discharged, 9 have disappeared on the patient's own responsibility without conclusive result; of the remaining 21, 11 have been cures and 10 failures—that is to say, roughly, my successes in the *x*-ray treatment of ringworm are 50 per cent. There is no other treatment of ringworm that can claim such a result. Against this, in 102 cases I have had 1 burn which will result in permanent baldness—that is, the danger of a catastrophe is under 1 per cent.

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[1] Brit. Med. Jl., Feb. 3, 1906.

These figures make it appear that at last we have found a really reliable treatment, with very fair prospect of cure, and very slight danger of injury, for ringworm. I am very much afraid that this is not the case.

Leaving my own cases I will for the moment generalize. The advantage of the *x*-ray treatment is that in successful cases a singularly intractable disease, occurring unfortunately at a time of life singularly important from an educational and developmental point of view, is once and for all eradicated. But here I would say that it is only in localized cases of ringworm that such a result should be expected; if it be generalized, or in scattered patches all over the head, more than one treatment is necessary.

In successful cases the depilation should occur three weeks after treatment, and the hair should be growing well in, say, three months. So a cure may be looked for to be pronounced successful in, say, six months. This result against other treatments is six months against six years (if lucky) or more.

The disadvantages are: (1) A specially-trained nurse is necessary to carry out the treatment; (2) the danger of an *x*-ray burn; (3) the difficulty of regulating the dose of *x*-rays.

A specially trained nurse means expense, and at the present time it is not right entirely to disregard the danger to which a constant worker in the *x*-rays is exposed.

Secondly, with regard to the danger of an *x*-ray burn, it is significant that my single case (so far) occurred after so much experience. I believe that idiosyncrasy goes for much; it seems to me that light-haired, fair-complexioned people, those who would be expected to suffer most from sunburn, are most likely to be singularly sensitive to the *x*-rays.

Thirdly, the difficulty of estimating the dosage of *x*-rays. Here we arrive at the crux of the whole difficulty. In the first place *x*-ray tubes are most unstable and alter almost from moment to moment; and in the second, although we can measure tolerably correctly what goes into a tube, our means of estimating what comes out of it are dependent on far less reliable data.

Besides the three disadvantages mentioned above there is, fourthly, the class of case to which most of my failures belong. There is no burn, and the patient suffers no harm, but has all the bother and expense of the treatment, and still suffers from ringworm. These are cases in which the hair comes out patchily, and small scattered islets of infected hairs are still left dotted about all over the scalp. One is afraid to repeate the treatment for fear of inducing dermatitis, and when the hair grows again on the denuded areas it becomes reinfected from the older spots. These cases are most disheartening for both doctor and patient, as the only thing to do is to wait patiently for all effects of the treatment to disappear and then start again; by which time—at all events, in a hospital out-patient department—you have probably lost your patient for ever.

Another fact, which may or may not be a disadvantage, is that even when it has grown considerably the new hair is often of a different color to the old; this change is, I should think, only temporary, analogous perhaps to the pigmentary changes observable in the skin itself after x-radiation.

Coming now to the technical details of treatment at Guy's we usually work as follows:

1. The patient's scalp is kept 6 in. from the anode.

2. The tension of the x-ray tube is kept as nearly as possible at the equivalent of an electric spark of 3 in. in the air.

3. The amount of current in the secondary circuit is 0.20 to 0.30 milliampère.

4. Sabouraud's pastilles are used as a check.

5. The time—unless Sabouraud's pastilles have changed before—is not to exceed in some cases twenty, in others twenty-five minutes.

6. A tightly fitting lint cap is fitted on the child's scalp, and on this is marked out an H, which divides the scalp into two lateral, a medio-frontal and an occipital area. These areas are treated one after another for the time specified, the spaces not exposed being protected by fairly thick lead foil, which is held in place by a coarse elastic net, a very useful little device, this latter, which was designed by Nurse Hill of this department. The child is then seated as comfortably as can be in a chair and kept still during the radiation, which seems also to exert a decidedly somnolent effect on most children. Most workers, I believe, have obtained very consistent results with Sabouraud's

pastilles. I am very sorry to have to admit that this is not my experience. Some seem to change much more quickly than others.

7. With light-haired, delicate-looking children the shorter limit of twenty minutes is sufficient; with dark-haired, strong and older children—and in cases of parasitic alopecia areata—the limit may be extended to twenty-five minutes.

The careful attention to all these details requires much patience on the part of the nurse, and a single treatment with the head divided into four parts takes about two and a half hours.

I must here refer to the method introduced, I believe, by Dr. Macleod, of Charing Cross Hospital, of attempting to obtain an exact dosage of *x*-radiation by means of measuring the interruptions in the primary circuit. The method is a distinct advance, and an advance too, on scientific lines, but it is yet too early to know if this is the last word on the subject. Speaking with due deference, it seems to me that, while it is a very beautiful and exact method of regulating what goes into the tube, it is really only an indirect way of estimating what comes out of it.

Professor Schiff, perhaps the greatest exponent of *x*-radiation living, did me the honor a few weeks back of coming to see me in my department at Guy's. He told me that he had not found Săbouraud's pastilles reliable enough to be an absolute criterion, and that he relied on the visual appearance presented by the phosphorescent tube when excited, and his experience, when ordering the length of time the sitting should take.

I have perhaps said enough to show that the *x*-ray treatment of ringworm is by no means perfect as yet; it must still be considered on its trial. So long as cases are treated by those who thoroughly understand the dangers likely to be met with, perhaps the method may be recommended; but it should be thoroughly understood that until we have an exact regulation of the *x*-rays, and until *x*-ray tubes are far more stable than they are at present, it is not a treatment that is absolutely free from danger, which, if remote, is at the same time real.

FEVER IN THE NEWBORN[1].

By William J. Butler, M.D.

An interesting phase of the first days of infant life is the many deviations from the normal temperature that occur and which are so frequently overlooked unless thermometry is regularly practiced.

It is not improbable, however, that this practice, the importance of which cannot be too strongly urged, is seldom pursued to any extent even in maternity wards, unless an infant presents some marked evidence of illness; whereas the thermometer only in many cases renders it possible to determine early the presence of disease which by other methods of examination might be overlooked.

That this latter frequently occurs, and that an apparent want of acquaintance with diseases of the newborn exists, is well illustrated in the vital statistics by the meaningless terms ascribed as causes of death, to-wit, icterus, convulsions, etc.

The temperature of the newborn immediately after birth is somewhat higher than that of the mother, the temperature of the latter being from 0.2 F. (0.1 C.), according to Wurster,[1] to 0.9 F. (0.5 C.), according to Davy,[2] lower than that of the child. In full term babes the rectal temperature is found to average, according to Barensprung,[3] 100 F. (37.81 C.); Lepine,[4] 99.8 F. (37.7 C.); Andral,[5] 100.2 F. (37.9 C.); Hennig,[6] 100.2 F. (37.9 C.). In consequence of the cooling of the surface incident to exposure and the first bath, where employed, there is a drop in the temperature in the course of an hour or two of from 1.76 F. (.95 C.), according to Schäfer,[7] to 3.3 F. (1.87 C.), according to Sommer,[8]. Eross explains this apparently wide difference by assuming that some observers take the temperature immediately following the bath and thus do not note the subsequent decline. It gradually rises after several hours, and from twelve to thirty-six hours it reaches an average of 99.8 F. (37.67 C.), according to Eross;[9] 99.5 F. (37.5 C.), according to Jurgensen;[10] 99.2 F. (37.35 C.), according to Fehling.[11]

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*Jl. A. M. A.

Forester[12] called attention to a second decline on the fourth day, at which time the temperature averages 98.8 F. (37.1 C.). Following this there is a second rise, first noted by Barensprung,[3] which reaches its maximum on the eighth day, averaging 99.2 F. (37.4 C.).

Feis[13] believes that the fall in temperature between the third and fifth days is due to hunger of the infant. He thinks there exists a direct relation between the decline on the fourth day and elevation on the eighth day and the increase in the quantity of nourishment taken, which was first suggested by Eross,[9] and to the gain in weight, which latter point had been previously made by Barensprung.[3]

Raudnitz,[14] however, was disinclined to accept the explanations offered for the double rise and fall of temperature in the first week, considering them conjectural, at the same time suggesting the less plausible theory that the second decline and rise of temperature occurring between the fourth and eighth days was a slow reflected compensatory wave following the first marked decline after birth. Lepine[4] observed a somewhat higher temperature in children in whom the initial loss of weight ceased early.

A number of writers in their careful studies of the temperature in the newborn confirmed the observations of Forester[12] and Barensprung.[3] Eross[9] called special attention to the limits of normal temperature on the fourth and fifth days, and stated that from his observations a rise to 100 F. (37.8 C.) or 100.2 F. (37.9 C.) occurred during this time only under pathological conditions.

Abnormal elevations of temperature are not uncommon in the first days of life, in some instances lasting several hours only, in many a few days, and in others persisting for two or three weeks or a longer time. The exact cause of them, where no gross pathologic lesion presents itself clinically, may at times be difficult to determine. Their frequently transient character and early disappearance after the establishment of lactation led Holt[15] and McLean to style some of them inanition temperatures. To say the least, this seems paradoxical and untenable in the light of the above observations, especially when we consider that starvation in infancy is invariably associated with subnormal temperature unless an infection is present.

Demme[16] observed that within the first half hour after nursing the rectal temperature dropped a few tenths of a degree and in the next sixty to ninety minutes it rose from 0.3 F. (0.2 C.) to 1.4 F. (0.8 C.) higher than before nursing, and in the next 30 to 60 minutes it declined to the temperature noted before nursing. The disappearance of febrile temperatures coincident with the establishment of free lactation probably depends on the rapid elimination of absorbed toxic products (possibly from the cord or from abraded or inflamed surfaces) incident to the increased quantities of fluids taken, or more probably on the action of antitoxins derived from the milk.

Some observers are inclined to associate many of the pyrexias with uric acid irritation of the kidneys or anuria. In the majority of the newborn uric acid infarcts are formed in the uriniferous tubules in the first ten days. Flensburg[17] believes they are formed by a deposit of urate of ammonium around an albuminous exudate in the tubules. Schreiber[18] considers the exfoliated epithelium of the tubules analogous to the desquamation of the skin the basis of the casts. According to Horbaczewski, the excessive excretion of uric acid is due to the great increase in metabolism and destruction of leucocytes in the newborn. These infarcts are washed out by the pressure and solvent action of urine secreted higher up in the tubules. The condition is so common to the first days of life that it is considered physiologic. When the urine is diminished in quantity and concentrated as the result of a febrile disturbance or existing diarrhea it is evident that there might be a temporary or permanent suppression of urine, which must be regarded as secondary to and not the cause of pyrexia, as anuria ordinarily is not accompanied by a rise in temperature.

While elevations of temperature in infants may be produced by apparently slight causes, it was noted by Epstein[19] that in many instances newborn, who during life presented no elevation of temperature or even showed apyrexia, succumbed to extensive inflammation of serous membranes, an analogous condition to which is occasionally found in the afebrile and virulent septic peritonitis of the adult. This would seem to suggest that the infant reacts not unlike adults to infection of similar tissues, so far as temperature is concerned. Apyretic infections, however, are the exception, as they are almost invariably associated with fever.

In 1892, in his clinical report of the diseased conditions found in a thousand newborn infants in the Gebär Anstalt in Budapest, Eross[9] stated that elevation of temperature was present in 431 cases. In 51 per cent. of these he referred the temperature to putrefactive changes in the cord, or inflammatory processes in the navel. In many of the latter the changes remained localized; in others they gave rise to general sepsis. In 25 per cent. of the cases febrile temperature was associated with dyspepsia or catarrhal enteritis. In twenty-one cases the cause of pyrexia was referable to inflammation of serous membranes or the lungs. In seventy-nine cases the source of the temperature was not determinable, but he believed it was due to foci of infection he could not locate.

While the above observations showed an unusual large percentage of infants developing temperature in the first days of life, it is quite in keeping with the earlier observations of Epstein,[10] who, in 1885, stated that in the Prague Gebär Anstalt 30 per cent. of newborn died of sepsis before the introduction of antisepsis, and that thereafter it was reduced to 5 per cent.

In 1895 Eross[9] wrote that since the employment of rigid prophylactic measures the febrile conditions in the newborn had been reduced from 45 per cent. to 11.38 per cent. No stronger evidence than these latter statements could be deduced to show that febrile temperatures in the first days of life are a manifestation of infection or toxemia, even though we are unable at times to trace its origin and that they are preventable to a great degree by appropriate prophylactic measures.

The opportunities for infection in the newborn in the birth canal, at birth and subsequent thereto, are numerous, to-wit: By the contact of infectious material with the eyes, its entrance into the mouth or nose, to be later swallowed or aspirated; the introduction of the unclean finger into the mouth, and abrasions of the mucosa, which Epstein[1] demonstrated was the starting point of Bednar's aphthæ, which he also stated was capable of giving rise to sepsis in the infant; traumas incident to forceps delivery or subsequent accident; contaminated environment and unclean attendant; the existence of an always possible focus of infection, namely, the navel, which Quinquaud,[20] in 1872, was the first to suggest as the port of entry for infectious material in sepsis neonatorum, which had previously been regarded as a condition that developed *in utero* or during birth in septic mothers. The fallacy of this latter theory was subsequently proven by Runge,[21] who reported epidemics of sepsis occurring in the newborn while the mothers remained healthy.

Although infection from the navel has been enormously reduced since the introduction of asepsis, Eross[9] entertained the view that it had not been lessened to the extent that puerperal infection had in the mother. While there is a tendency to disregard changes in the cord stump or navel as a very frequent cause of temperature in the newborn, it is well to bear in mind that in preantiseptic days sepsis developing from this source was responsible for a large proportion of the deaths occurring among them, and that strict asepsis, with regard to the infant, is not always adhered to at the present time. Clinical observation and subsequent anatomic examinations show that even slight and superficial inflammatory processes in the navel are sufficient to give rise to general infection.

Cholomogroff's[22] bacteriologic studies showed that in the proximal part of a cord stump that is undergoing moist gangrene, micro-organisms identical with those obtained from the lochia in puerperal sepsis, namely, streptococci and staphylococci, are found. He suggests that this renders possible the transfer of septic material from the cord stump of a healthy child to the infant itself or to the mother.

In the various infections that attack the newborn, depending on its character, different micro-organisms are found. The bacteria above mentioned are those usually found in sepsis neonatorum, whatever may be its clinical manifestations.

The nasal and oral cavities are no less important as portals for entry of infection in the newborn than at a later period of infancy and childhood, and as a consequence infection of the respiratory and gastrointestinal tracts is not uncommon. Infections of the respiratory organs are far less frequent, however, than those of the gastrointestinal tube. While many of the disorders of the latter are simply functional disturbances, and others are slight gastrointestinal catarrhs, some of them assume the form of what Epstein,[19] and later Fischl,[23] described as gastrointestinal sepsis. It is a well-known fact that sepsis in the newborn may run its course as a gastroenteritis, as a general sepsis or pyemia, following navel or other local infections, as Buhl's or Winckel's diseases, the septic nature of which is no longer doubted, or under the clinical picture of an hemorrhagic diathesis.

Gastrointestinal disturbances, however, may exist as an associate symptom-complex with almost any acute disease of infancy, and, unfortunately, at times for the infant, they may occupy the entire attention of the physician, and the primary affection may be overlooked. On the other hand, the gastrointestinal symptoms may attain such a degree as to render their treatment of paramount importance. This is no less true occasionally in renal insufficiency in infants.

The following cases occurring as a ward epidemic in the newborn, presented many points of interest that appeared worthy of reporting:

CASE HISTORIES.

CASE I.—S., an infant, born Feb. 9, 1905, after normal labor. Nothing unusual was noted in the child. He weighed six pounds, one ounce. Meconium was passed freely and he urinated twice in the first twenty-four hours, at the end of which time the temperature was 99.8 (37.8 C.) It rose thereafter, reaching the maximum elevation on the fifth and sixth days of 105.6 F. (40.9 C.), and continued as a remittent fever during his stay of fifteen days in the hospital. He nursed indifferently, was restless and vomited occasionally. Bowel movements were frequent, greenish in color and contained considerable mucus.

Examination.—Examination on the fourth day revealed a small male infant, considerably emaciated and very drowsy. Head, eyes and face negative. Throat congested. Respiratory murmur harsh. Heart area not enlarged. No adventitious sounds. Liver palpable. The cord dressing was stained with a brownish discharge of fetid odor. Cord stump was soft and of greenish color.

Examination of mother failed to show anything abnormal. Lactation was established on the third day. Breasts well filled. No excoriations or fissures of the nipples. The infant was again examined on the sixth day, when the physical findings were found the same, and in addition there was a papulo-pustular eruption on the neck, chest and arms. It was also noted that he coughed and sneezed occasionally and there was at times a slight nasal discharge present. He lost weight rapidly, and at the end of eight days weighed twenty-one ounces less than his birth weight, and did not regain any while in the hospital. The cord dropped off on the thirteenth day. The navel was excoriated, reddened and moist, an umbilici catarrhalis of Runge.

CASE 2.—L., an infant, was born Feb. 15, 1905, after an uneventful labor. He appeared healthy and weighed five pounds and fifteen ounces. After receiving the usual attention he was placed in the same cot with infant in Case 1. His bowels moved regularly, but urine was not voided in the first forty-eight hours, after which time it passed freely.

At the end of the second day the temperature was 100.2 F. (37.9 C.), which continued to rise and persisted as a remittent fever for eighteen days. On the third day he weighed five pounds five and a half ounces, which he maintained until the disappearance of temperature. He was restless, slept little, coughed infrequently and nursed poorly. On the ninth day epistaxis occurred, and on the eleventh day there was considerable discharge from the nose.

Examination.—Physical examination gave practically the same results as noted in the infant in case 1, except no eruptions were present, and there was a loud systolic murmur heard over the cardiac area during the continuance of temperature, but disappeared thereafter. The cord, which apparently had undergone normal mummification, dropped off on the sixth day. With the subsidence of temperature, which had continued for seventeen days, all symptoms disappeared and he gained rapidly in weight. The mother pursued a normal course following labor and had an abundance of breast milk.

CASE 3.—L., an infant, was born Feb. 15, 1905, after a normal labor. He weighed eight pounds, four ounces and did not present any abnormalities. He was assigned to the same cot with the above infants. The bowels moved two to four times in twenty-four hours.

First urination recorded was forty-four hours after birth, at which time the temperature was 100.8 F. (38.2 C.), and continued to rise, reaching a maximum of 104.4 F. (40.2 C.) on the fourth day and persisting as a remittent fever throughout. He urinated freely on the third and fourth days, but thereafter there was complete anuria for six days. At first he was restless, nursed little, coughed and sneezed at times and lost weight rapidly. Later he vomited; bowels moved frequently; he was very drowsy and moaned a great deal.

Examination.—Physical examination gave practically the same as found in the infant in case 1. The cord mummified in its distal portion, but the proximal part was moist, brownish in color, with a slight discharge at its base. It dropped off on the fifth day, leaving a moist, excoriated surface.

On the tenth day he had frequent eclamptic seizures. There was a constant and marked longitudinal nystagmus. The head was slightly retracted and later the legs and arms were somewhat rigid. After an attack of vomiting he became suddenly cyanotic and died in a few minutes.

The mother had an uneventful convalescence and a good supply of milk.

Case 4.—C., an infant, was born Feb. 18, 1905. He weighed six pounds and four ounces. There was a pressure paresis of the left facial present. He was placed in the same cot with the above infants. The nurse recorded a slight convulsion eleven hours after birth. At the end of thirty hours the temperature was 102 F. (38.9 C.) In forty-eight hours it was 106 F. (41.1 C.) Up to this time meconium and urine were regularly voided.

He was restless and, as in the case of the other infants, he coughed and sneezed occasionally. During the fourth, fifth and sixth days he urinated but once in twenty-four hours. Thereafter, with the drop in temperature, frequent urinations were recorded. The cord changes were similar to those mentioned in case 3. It dropped off on the tenth day. The mother did not present anything abnormal.

Following are the findings of postmortem made by Dr. Bassoe on the infant in case 3:

Anatomic Diagnosis: 1. Acute rhinitis, pharyngitis, laryngitis, tracheitis and bronchitis; 2. uric acid infarctions in both kidneys; 3. catarrhal enteritis; 4. nodule in liver.

Examination: Weight, 2,450 gm.

There is a reddish discoloration of the skin, especially of the upper limbs. Slight excoriation about the umbilicus. The peritoneal cavity is empty. Rectum and sigmoid are distended with gas. Rest of intestine is not distended. The appendix is 6½ cm. long and bent on itself. Peritoneum is smooth throughout. Pleural and pericardial cavities are empty. Thymus is small. The pharynx contains very viscid whitish mucus. The posterior nares contain same kind of mucus. Mucous membrane of pharynx is hyperemic and smooth. No pus is found in sphenoidal or ethmoidal sinuses or in tympanic cavity. The larynx and trachea are filled with mucopus. On scraping off the mucus the membrane is smooth and very slightly hyperemic. The mucus is not blood-stained. Lungs are pink and crepitate throughout. Cut surfaces are smooth. Small amount of mucus can be expressed from the middle-sized bronchi. There are no visible areas of consolidation. Heart is proportionate in size and normal. Spleen measures 3½x2x1 cm. On section it is dark red and has a normal consistency. The tongue is smooth and has a normal appearance. Esophagus is smooth. The stomach is empty and contains small amount of mucus. Liver weighs 100 gm. Surface is smooth. There is some reddish discolorations on right lobe. Normal consistency on section. It is light grayish-red, in places pale red, lobular markings indistinct. On the surface of the left lobe is a yellowish-white, slightly raised area, 4 mm. in diameter. It extends 3 mm. into the interior, forming a globular nodule, sharply separated from surrounding tissue.

The gall bladder contains viscid bile. Kidneys of proportionate size. The capsule peels readily, leaving a smooth surface. All pyramids are of a grayish color. Urinary bladder is empty. Prostate is normal. Testicles are normal. The center of ossification in lower end of femur is 4 mm. in diameter. Line between bone and cartilage is regular.

Histology: Thyroid. Colloid very abundant, considering age of individual. In the bronchus were masses of red cells in which there are leucocytes adherent to the mucosa. The epithelium of the latter is well preserved; its vessels very hyperemic. In the lungs, septa were very hyperemic. Many alveoli are filled with red cells and leucocytes; most of them, however, remain open. No changes were noticed in the stomach and the intestine. There was considerable fatty degeneration in the liver. Urate deposits in tubules of pyramids, demonstrated in frozen sections, were found in the kidneys. On treating with H Cl, or acetic acid, uric acid crystals were formed.

Bacteriologic examination made by Dr. D. J. Davis gave the following:

The material examined bacteriologically was heart's blood, bile, cerebrospinal fluid, purulent masses from pharynx and bronchi. Heart's blood, bile and cerebrospinal fluid gave negative results.

Smears of the pharyngeal mucus showed a considerable number of an encapsulated Gram-staining diplococcus, evidently the pneumococcus, also a very large number of non-Gram cocci or diplococci, principally outside the leucocytes, though frequently within. Polynuclear leucocytes are very abundant. Smears of the bronchial mucus show the same organisms, but there are fewer pneumococci. Cultures were made on blood-agar plates from the pharynx and bronchus. Pneumococcus colonies were abundant, but far more numerous were colonies of micrococcus catarrhalis. On blood-agar the colonies of this organism are round, raised, grayish-blue, without a zone of hemolysis. It grows best on blood-agar or Loeffler's blood serum. In bouillon there is slight cloudiness at first, with formation of coarse granules, forming an abundant sediment in forty-eight hours. It does not change litmus milk and grows freely on potato. It is a non-Gram staining, small coccus, often in pairs and being frequently found in leucocytes is easily mistaken for the meningococcus. The amount of 5 c.c. of a twenty-four-hour bouillon culture was inoculated into the pleural cavity of a guinea-pig weighing 380 gm. The pig remained perfectly well, the culture apparently having no effect.

The postmortem did not show any important local changes in the navel nor an endarteritis or phlebitis of the umbilical vessels, there being noted only superficial excoriations, although during life the cord had not mummified normally and there was a brownish fetid discharge present. The bacteriologic examination of the blood, bile and cerebrospinal fluid was negative. All the clinical manifestations were, therefore, plainly referable to infection of the respiratory tract and to anuria incident to extensive uric acid infarctions of both kidneys.

The little patients presented many points of clinical interest.

They demonstrated the susceptibility of the newborn to infection of the air passages. They illustrated the rapidity of conveyance and the briefness of incubation in infection with the micrococcus catarrhalis and pneumococcus, likewise its tenacity and seriousness in the newborn. They suggested the contagiousness of what ordinarily might be termed a "cold" and gave color to the time-honored maternal observation that the "baby was born with a cold."

ETIOLOGY.

The original source of infection in these cases was not determinable. Gaertner[24] reported an epidemic of pneumonia in eight newborn in the Heidelburg Gebär Anstalt, caused by staphylococci and streptococci, which micro-organisms he was able to cultivate from the mattresses of the lying-in patients. This latter investigation does not, however, seem convincing.

Children born in the ward subsequent to my last reported case and kept in a different room did not develop temperature or evidence of disease, whereas all infants placed in contact with Case 1 and subsequent cases developed same.

The clinical symptoms presented considerable uniformity in all cases, but nothing characteristic. At times they were restless and slept little; at other times drowsy and not easily awakened. They coughed and sneezed, but infrequently and neither could be regarded as a prominent symptom. There was a slight nasal discharge in two cases, one having epistaxis. They nursed poorly, vomited occasionally, and the bowel movement was somewhat frequent, sometimes green, and contained, on and off, mucus and curds. The urine often showed brick dust deposits. The temperature was high, remittent in character, and in the cases that recovered declined slowly to lysis.

Physical examination showed evidence of an acute rhinitis and pharyngitis. The respiratory murmur was harsh, otherwise negative. Respirations were somewhat accelerated. In two cases there were skin eruptions on neck, chest and extremities; in one papulo-pustular; in the other petechial.

Regarding the secretion of urine in these cases, it will be noted that the infant in Case 3 urinated freely for the first four days, when the temperature reached 104.4 F. (40.2 C.), after which time there was anuria for six days when he succumbed, evidently to uremia. In this patient, as a result of the infection with accompanying temperature and diarrhea, the urine being concentrated and small in amount, was insufficient to force out or dissolve, as previously mentioned, the infarctions already formed, and instead contributed to increasing them by further deposits of urate of ammonium, the water being absorbed. Anuria resulted, leading subsequently to, in all probability, uremic poisoning.

It would seem that urinary suppression in the newborn when associated with temperature is a result of the concentration of the urine incident to the cause of the latter, or a co-existing diarrhea, and to uric acid infarcts in the kidneys, rather than that the temperature is due to the latter. It is hardly necessary to mention that this presupposes a normal anatomic status of the urinary tract.

TREATMENT.

The treatment of infections of the respiratory tract and all other infections in the newborn rests primarily in prophylaxis, a strict observance of asepsis and protection against infection of the infant while in the birth canal, at delivery, and subsequent thereto. The oft-repeated admonition of antiseptic douching at the onset of labor in case of suspected gonorrheal infection in the mother and the immediate care of the eyes by Credé's method ever holds good for the prevention of ophthalmia neonatorum. The douching also removes bacteria that are commonly found in the vaginal secretion and which, according to Kneise, are always present in the mouth of the newborn. The opinion was early expressed by Epstein[19] that contaminated amniotic fluid might be responsible in some instances for infection of the respiratory and gastrointestinal tracts in the newborn, and suggested the necessity of avoiding frequent examination after the rupture of the bag of waters. It is probable, however, that the pathogenic organisms of the vaginal bacterial flora which may be virulent would better explain such infections.

Of vital importance to the infant is the treatment of the cord, for which many methods have been advocated, some of which have been quite radical because of unfortunate occurrences. Because of an experience with tetanus in the newborn, Martin[25] advised cutting the cord after ligation with red-hot scissors. Dickinson[26] recommends excising the cord entirely, ligating the umbilical vessels, and suturing the skin over them, claiming that the sloughing process at the child's navel is not consistent with asepsis in child-bed. While a moist gangrene of the cord may not be, a normal mummification of the cord can not carry any such dangers.

Occlusive dressings have also been used, but Runge[21] long ago demonstrated that such a method delayed separation of the stump, which remained moist and fetid. An hygroscopic dressing of plaster-of-paris is also practiced, and Cholomogroff,[22] from his bacteriologic investigations, believed that it possessed advantages over other methods. Whatever be the method used, asepsis should characterize its treatment as thoroughly as the stump of an ovariotomy.

When an infection of the respiratory tract or any other organ or tissue develops in a newborn babe in a maternity ward it is evident from the above cases that it should be isolated, and that a nurse attending it should neither attend uninfected mothers nor children. Winckel stated that the same nurse should not at any time care for both mother and child. Where it is not practical to carry out Winckel's plan the infant should receive first care. There is little doubt that some infections in children may be conveyed through the medium of the attendant. In fact, as Kehrer[27] urged, the infant should not share the bed of its mother, nor, as might be added, the bed of other newborn, for obvious reasons. The infant should be protected against infections, acute or chronic, of the respiratory tract of the mother or nurse. It is not improbable that the first infected of the above children acquired the same from the mother or the attendant.

Reich[28] reported instances of direct conveyance of tubercular infection by a midwife who was accustomed to blow into the nose of the infant to establish respiration after she had aspirated mucus from the oral cavity of the child, by aspirating directly with her mouth. Ten children so treated died within fourteen months from tubercular meningitis, although their heredity was negative. Later the midwife herself died from pulmonary tuberculosis.

The immediate care of the affected infant must necessarily be symptomatic.

In the above patients the temperature and restlessness were combatted by sponging and bathing. The gastrointestinal symptoms were treated when the stools showed undigested material. by diluting the breast milk by the administration of sterile water before nursing, and in case vomiting was present, by prolonging the interval of nursing and giving lime water at that time. Enteroclysis was employed, also small doses of calomel, 1-40 gr., or castor oil.

To overcome the tendency to anuria, water was given frequently, and, at times, small doses of potassium citrate. The most effective measure in this regard, in addition to increasing fluids consumed, is the use of high rectal enemas of salt solution or sodium bicarbonate to be retained. They were given at six-hour intervals, about two ounces being used.

Concerning the immediate treatment of the respiratory tract, the nares were swabbed three or four times daily with boric acid solution. No expectorants were given because of the probability of increasing gastric disturbance.

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INFANT FEEDING WITH COW'S MILK.

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On this long mooted subject I have absolutely nothing new to say; nor is there in my paper any attempt at anything new. Rather, it is an effort to direct backwards, pointing toward the thoughtful use of cow's milk and from the unthoughtful use of proprietary artificial foods as thrust upon us by their manufacturers and urged upon us "for trial" by parents, the deluded subjects of advertisements.

Although the title of my paper is "Infant Feeding With Cow's Milk," I find it necessary, for sake of argument, to speak of other goods generally used, I believe, at this tender age.

How often we hear in answer to our questions while taking the past history of a case, about the following: As I was unable to nurse the baby after the first few weeks we tried, first, modified cow's milk. This not agreeing after a few days' trial, the baby was put on—" and here follows an appaling list of proprietary foods each tried from a few days to a week or so, "until at last one was found that suited." My thought for this answer is always:—"You did not find a food that suited in your sense of the expression, but you did have a baby who has lived through all this abuse of unscientific experimenting in spite of you."

By what right have we to give a few weeks' old baby cereals, starch, baked flour, cane sugar, digested starch (maltose or dextrine) etc., etc., when not one of these substances, their ingredients or derivatives are found in milk human or animal?

Why believe them in themselves, or when added to cow's milk to make a nearer substitute for mother's milk than is modified cow's milk? Is a nearer substitute made by adding ingredients absolutely foreign to the original substance or is it simply because the manufacturer, his attractive advertisements and time-consuming drummer say so? It seems to me, that this is about the only reason for maltreating in such a manner the delicate mucous membrane of the baby's gastro-intestinal canal.

A second misleading suggestion is given us through the proprietary food advertisements. It is the rules for feeding. They are all based upon the infant's age. This is manifestly absurd. How often I see babies in Dispensary and private practice fed by rule of bottle of baked flour directions I dislike to recall. The frequency of over-feeding in quality is maybe the most marked. Many a marasmic baby of twelve months, weighing but twelve pounds or so, vomiting and regurgitating at every feeding, having constant colic, curds in stools, fermentative intestinal indigestion, etc., is found to be taking proprietary artificial food modifications suitable for twelve months and twenty pounds of normal development, because the unfortunate is twelve months old.

How wrong this is one cannot find words to say. How pitiful it is when practiced by conscientious, painstaking, intelligent mothers who have taken the proprietary food directions for gospel truth and who, of course, and most naturally believe they should be given stronger food! My opinion is that a baby should be fed as to quality, quantity and interval, not by age; but according to its weight, development, power of digestion and assimilation. Each weaning and feeding should be studied individually; studied as an adult patient is studied for the administration of treatment and drugs.

A tendency toward regurgitation, colic and constipation, or the above conditions firmly established, cannot be scientifically or even sensibly, attacked by the unthoughtful administration of proprietary foods. We can control ingredients by dilution and dilution alone. Shall we wish to weaken the proteid, for instance, we can do it, but the fat and sugar are diluted in proportion. We have no control of separate elements as we have in cow's milk to a certain and fairly satisfactory extent.

A case in point illustrating how unreliable are some of the proprietary manufacturers' directions has lately come to my notice. It is in form of a physician's pocket card for home modification of milk. In the first column are ages from the first week to the twelfth month. In the second (and this is the one to note) it directs: "Take of upper part of a quart bottle of fresh cow's milk, 'top milk,' " such and such a quantity for such and such an age. The following columns enumerate the remaining ingredients (including the manufacturer's) to be added with last columns containing the figured percentages of fat, sugar and proteid.

How indefinite is this, "take of upper part of quart bottle, 'top milk.' "

I called the drummer's attention to it, asking if he presumed all parents and physicians would understand it means upper 1-3 or 10 per cent. milk. He replied, "Of course, they would." I doubt it. This, however, is not the glaring misleading fault of the card.

Going down the second column to twelve months, I find to take (still of "upper part of bottle, 'top milk' ") so many ounces for the modification of this age. A little figuring, assuming the "upper part" the upper one third (as the drummer told me, of course, would be understood) and I arrive at a modification for a year-old baby of fat 7.8 per cent.; proteid 2.9 per cent. On the card the fat is 4 per cent., proteid 3 per cent.

Should I point this out to the drummer, he would undoubtedly say, "Why, of course, at twelve months you should use whole milk for your modifications." That is near the truth, but the card does not intimate it even. So by following the directions on this card we would give a year-old baby over 3.5 per cent. too high fat and reap in consequence the reward of our folly and carelessness in taking the manufacturer's say-so on his apparently scientific percentage feeding card.

In these proprietary foods the item of expense is not to be disregarded. I but wish all the money expended broadcast upon them might find its way to the most worthy dairyman striving to give us a clean, wholesome cow's milk, not only for infant consumption but for the community as well.

Proprietary, artificial foods have their value, I will acknowledge, but I believe only in the sense of drugs, to be used cautiously for a limited time, and with full knowledge of their ingredients. I think the older practioners here will agree with me that drugs have but a limited value in pediatrics balanced against sound, sensible feed, care and nursing.

Rotch, Holt, Chapin, Northrup, Freeman, Jacobi, (although the latter has always advised a cereal added to cow's milk in the dilutant for its mechanical effect in breaking up the curd) and the other leaders in pediatrics give us as the result of their long labor and experience, practice, observation, scientific analysis and study, the advice to feed cow's milk when the baby is deprived of its natural nursing. I believe these are men we should follow. They have made their point clear; they continue their work and investigations to instruct us in writings and lectures. One and all, they stand by cow's milk as the years pass by, while the proprietary foods spring up like weeds to check the fertile growth.

In the beginning administration of cow's milk one thing to be borne constantly in mind is, not to give it in too strong dilutions. Its proteids are chemically different from mother's milk and decidedly harder of digestion as we all know, and is repeatedly called to our attention in reading and troublesome experiences. Knowing as we do this particular peculiarity there is always temptation when of necessity we must needs wean in early life, to help out by peptonizing. I feel that this as a routine is a great mistake.

Far better in my experience is it to begin our artificial feeding with very low percentages, no matter the age or development of the infant or the analysis of the mother's milk of which the infant must unfortunately be deprived. Begin with too strong a milk mixture and the baby will not be nourished from lack of ability to manage the new food, but will in many cases be made ill. In consequence we have added to our problem a sick baby to feed. Begin so low in percentages of fats and proteids that the nurse will tell the mother that the baby is being starved, is a good rule. If the food is assimilated, if there is no colic, if good result, it is very easy to go ahead. In the vast majority of cases the organs of digestion will learn to perform their new duty if not crowded too fast and too hard. I believe that we may ignore a lack of gain in weight for the first week or so, if we succeed in obtaining with our new food a quiet baby, sleeping normally, having no regurgitation or colic and with good stools. With careful increase in the strength of the food, the infant taking it without symptoms of indigestion, the gain in weight will come and it is not the sugar cereal gain of flabby flesh, with possibly and probably later signs of rickets, scurvy, etc. To dilute and modify cow's milk easily and intelligently, knowing always just where we stand in percentages, I know of no better way than to follow Dr. Holt's directions: That is to divide the bottle into three parts, upper one-third, upper half and whole milk, containing generally 10 per cent., 7 per cent. and 4 per cent. respectively. Next to learn what this means, advisedly, for one of my commonest experiences is to hear: "We have tried Holt's modifications with no success." On question I find they have been no nearer Dr. Holt's standard than is the old sugar test!

Having a clear general idea of percentage feeding is almost always sufficient, for by that knowledge we have able weapons to correct colic due to too high proteids, constipation to too low or too high fats, and general gastric or intestinal disorders within reach of rational feeding therapeutics. I do not believe an over delicacy in percentage is necessary. Struggling between hundredths of per cents., changing infinitesimally day by day is over-shooting the mark. I do believe, however, the general tables as given by Dr. Holt, for instance, should be comprehended by all who have occasion to wean and feed infants. There is logic in it, reason and success.

ETIOLOGY AND SYMPTOMATOLOGY OF SCARLET FEVER.*

By James L. Fleming, M.D.,

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Scarlet fever is an acute, specific, infectious, contagious disease, characterized by sudden onset with high fever, headache, sore throat and vomiting, and by a scarlet red cutaneous eruption which later gives rise to desquamation.

The origin of the disease is uncertain. There are many suggestive descriptions in the writings of the early physicians from the time of Hippocrates, but none is sufficiently explicit to warrant conclusions. Measles, diphtheria, sepsis and purpura were the diseases which the early writers most frequently failed to differentiate from scarlatina. It was not until the sixteenth century (1560) that we find the first clear-cut, accurate description and positive recognition of the disease. For this recognition we are indebted to Ingrasseas of Palermo. In 1675 Sydenham wrote a full description of the disease and proposed the name which ever since has been universally accepted, "Febris Scarlatina."

In none of the acute exanthemata does our lack of knowledge of the causative agent prove so detrimental as in scarlet fever. Notwithstanding this lack of knowledge, the statement is generally accepted that the disease is produced by a specific microorganism. We are forced to this conclusion because of the similarity of its history, transmission and course when compared with other diseases of known parasitic origin. It belongs to the same group as measles, rubella, varicella and pertussis. In each of these the nature of the specific, infective virus is as yet unknown. All are, strictly speaking, contagious, and in no one, so far as we are able to determine, is the poison given off in a single definite discharge. It is not known where in the body the poison is formed, how it is given off, or in what form it is received by another person. This much we do know, that the disease does not arise *de novo,* and that every case has its origin in an antecedent attack in another individual.

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*Chic. Med. Rec.

TRANSMISSION.

"Scarlatinal poison is an entity that goes out from the body of a patient mingling with the air in the finest particles. This scarlatinal dust becomes thicker the nearer the atmosphere in question is to the body of the patient, its source and origin. Just as does every dust, this also settles on fixed objects."[1]

Transmission occurs either by direct or indirect contact with the scarlatinal patient. The prevailing opinion is that the poison is given off chiefly by the skin during the period of desquamation, but it is probably also given off with the secretions from the nose, throat and respiratory tract, and probably also in all the excretions such as the urine, feces and perspiration. Indeed, there are those who maintain that these are the sole source of contagion and that the skin is infective only by reason of its being contaminated by these discharges.

All objects are dangerous which have been in close contact with the patient as clothing, bed linen or toys, or any article in the room such as flowers, furniture, carpets, books, food, etc. Those who dust the clothes of others who have been in close contact with a scarlatinal patient may receive the contagion. Bed clothing airing in the window has been known to convey the disease to an adjoining house. There are instances where infection has taken place from washing the clothing of a scarlatinal patient with other clothing. Visits in the sick room are dangerous directly according to the proximity and duration of exposure.

Transmission through a third person may occur, but the interval must be short and contact close. Those most likely to carry the disease in this manner are physicians and nurses.

Transmission through one living in the same house but not coming in close contact is very unusual. Domestic animals as the dog and cat have been known to convey the disease.

Another source of infection is the food supply, especially milk. Numerous epidemics have been traced to the family of the milkman. Bell and Taylor[2] report an epidemic in which the first cases occurred in the family of a milkman. Of twelve families supplied, in six scarlatina appeared in a very short time, although in none had there been actual contact with the milk server, and all at a time when no epidemic was raging. Investigation showed that the milk had been kept in the kitchen which scarlet fever patients had frequented.

Welsh and Schamberg[3] after an extensive review of the literature, conclude as follows: "Scarlatina may be conveyed through a contaminated milk supply. The proposition is not proven beyond the peradventure of a doubt, but the chain of circumstantial evidence is so strong as to render conclusion almost irresistible. The view advanced by Klien that cows themselves suffer from scarlatina remains unproven and is not generally credited."

SURGICAL SCARLET FEVER.

That there is a special form of scarlet fever beginning in operative or traumatic wounds is maintained by many and denied by others. Hamilton[4] after a careful study of 174 reported cases, says that the evidence in many cases is meager, and that a careful analysis would prove them to be septic rather than scarlatinal infections. Of the undoubted cases there is no proof that the disease was in any way due to the coincident wound. She concludes:"There is no convincing proof in the literature that surgical scarlet fever is anything more than scarlet fever in the wounded."

With regard to the occurrence of scarlatina in the puerperal period, practically the same statement may be made. Either the so-called scarlatinal infections are septic, or the presence of scarlatina at such times is a coincidence and is in no way due to the puerperal wound.

One of the most remarkable things about the contagion of scarlet fever is its resistance and the tenacity with which it clings to the sick room and objects therein. Almost every physician has personal knowledge of cases where the disease was contracted months, or perhaps years, afterward by handling contaminated objects. A case cited by Murchison and Richardson[5] illustrates this resistance. Scarlet fever broke out in a family in which were four children. The infected child died and the other children, all healthy, were quickly removed. After several weeks the family returned to the home. Within twenty-four hours another child contracted the disease and died after a very short illness. The house was then thoroughly cleansed and whitewashed. After four months the family again returned, but the poison was still active for a third child early contracted the disease and succumbed as rapidly as the others. The source of the infection is thought to have been the straw in the bedding.

PREDISPOSING FACTORS.

Not every person exposed contracts the disease. Susceptibility is variable and nothing like so universal as in measles or smallpox. It has been estimated that from 38 per cent. to 40 per cent. of all persons of all ages exposed to the disease in epidemics, and who have not acquired immunity by previous attack, contract the disease[6]. In measles, under like conditions, the percentage is given as 99 per cent.

One attack usually confers immunity for life, although second and third attacks do occur, but are rare.

Age is a most important predisposing factor. The disease is not common under one year and quite rare under six months. In 5,000 cases of scarlet fever in the Municipal Hospital in Philadelphia, Welsh and Schamberg[7] found 1 per cent. of the cases were in infants under one year. Children from two to five years old seem to be the most susceptible. One-half of all cases occur in children under five years, and 90 per cent. of all cases under ten years[8]. After puberty and in adults the number of cases is comparatively few. No age, however, offers absolute immunity, as ten cases are reported in individuals over eighty-five years old and four of these were in persons over ninety years of age.

The disease occurs in epidemics, but is also as a rule endemic, especially in the large cities. The greatest number of cases occur during the cool months of the year, but these are also the months when the children are grouped together in schools and the best opportunity offered for the spread of the disease.

The negro race seems to be less susceptible and the mortality rate is lower than in the Caucasian race. The census report of 1890 shows a scarlatinal death rate of 14.2 per 1,000 deaths from all causes among the whites and 2.7 among the negroes. The figures for the 1900 census are 12 among the whites and 2.6 among the negroes.

BACTERIOLOGY.

There is little new and nothing positive to offer. Since the beginning of the bacteriological era many investigators have sought to find an organism specific in scarlatina, but the causal parasite is still unknown. Much of this work has been done by Chicago bacteriologists, especially Class, and, more recently, Hektoen and his co-workers in the Memorial Institute for Infectious Diseases.

Hoffman, Tschomer, Pohl, Klawann, Raskin and others associate micrococci as the causative agents. Frankel, Loeffler, Fiessenger, Dawson, Lemoyne, Baginski and others believe that the streptococcus bears an etiological relationship to scarlet fever and that the atrium of infection is the throat.

Class[9] holds that the actual cause is a diplococcus. He claims to have found the organism invariably present in the throat secretions, blood and scales of patients suffering with the disease. This diplococcus, according to Class, possesses an individuality differentiating it from other micro-organisms. He further claims to have found the organism pathogenic to experimental animals and in the guinea pig was able to produce a disease closely simulating scarlet fever.

If the work of Class could be verified by other investigators it would seem to be the solution of the problem. Such, however, is not the case. Schamberg and Gildersleeve[10] in examining one hundred cases of scarlet fever found the diplococcus of Class present in but fifteen. They further found that when the organism was isolated and cultivated in the various media, it reacted in a manner similar to the ordinary staphylococci.

Hektoen[11] in a recent study of the blood in scarlet fever patients with a special reference to streptococcemia, favors the view that the streptococcus infection is secondary because it is absent from the blood in such a large number of cases. He believes streptococci bears the same relation to scarlet fever as they do to diphtheria and smallpox. Streptococcemia has frequently been found in these two diseases.

Hektoen concludes as follows: "It seems to me that the best hypothesis of the etiology of scarlet fever for working purposes is the one that in this disease two infections generally coexist in the oro-pharyngeal cavity. The cause of the specific, primary infection is unknown. So far its existence has not been rendered evident except by the specific, contagious and clinico-epidemiologic peculiarities of scarlatina. The second infection is the streptococcus infection, which may be regarded as practically constant because there seems to be in all cases of scarlet fever, a marked increase in the number of streptococci in the throat when compared with normal conditions, but this infection does not seem, as a rule, to be generalized when we except the severe fatal cases. Whether the virus of scarlet fever directly increases the virulence of existing streptococci, stimulating them to the production of toxins peculiar to scarlet fever, and whether it favors general streptococcus infection by decreasing local or general resistance to streptococci are questions on which further light is greatly needed."

The recent researches of Mallory[12] may direct us in the right path. Mallory describes certain intracellular bodies found in the skin in four cases of scarlet fever. These bodies form a series closely analogous to the series seen in the development of the malarial parasite. These bodies were found only early in the disease, but even in this stage negative results were obtained in several cases. Because of the numerous star and wheel shapes of the rosettes, Mallory proposes the name "Cyclaster Scarlatinalis."

Mallory's researches have been carried further and partly verified by Duval[13]. Duval found a similar organism in the serum of blisters of the skin of scarlet fever patients, and he has traced it through a series of changes which show at least that it is a definite organism.

SYMPTOMATOLOGY.

No other of the acute exanthemata varies so greatly in intensity of outbreaks. Many cases are so mild as to be easily overlooked; others are terribly malignant. Individual epidemics also vary greatly in severity and morbidity. So marked is this variability that Gerhardt maintains that what we term scarlet fever may represent rather a group of diseases than a single disease.

Incubation.—Most common period is from two to six days, but a considerable degree of variation occurs. In 115 cases tabulated by Holt[14] in 87 per cent. of the cases the period was between two and six days; six cases were twenty four hours or less, and one case was twenty-one days. During incubation there are as a rule no subjective symptoms.

Invasion.—The onset is as a rule abrupt and the symptoms proportional to the severity of the attack. The earliest symptoms in the order of development in the adult are: Sore throat, headache, fever, and vomiting; in the child, vomiting or convulsions, fever, sore throat and malaise.

Vomiting is the earliest and most frequent invasive symptom in children. It is common to be told the child went to bed apparently well, but awoke in the night and vomited profusely or had repeated convulsions, and complained of dry throat and difficulty in swallowing. If the temperature is taken at this time it will be found high, 103 to 104°, and the pulse relatively rapid, 120 to 140.

Fever.—The temperature curve in scarlatina is fairly characteristic. There is an abrupt rise, reaching maximum on the second or third day when the eruption is complete. Then follows a period of variable duration, depending upon the severity of the case, during which temperature remains continuously high, though subject to slight fluctuations. The decline to normal is by lysis. In mild cases normal temperature is reached in about one week, in more severe cases in two weeks. Deviation from the common type or persistence of the fever beyond two weeks usually indicates a complication. This complication may be an otitis, suppurative adenitis, nephritis, pneumonia or severe throat symptoms. A rise of temperature after the exanthem has begun to fade is always to be looked on with suspicion.

Afebrile cases are not very rare. Hyperpyrexia is more common in scarlatina than in any other of the exanthematous diseases. Some of the highest reported temperatures have occurred in scarlet fever. Wonderlich reports a temperature of 110.3 degrees F., Thomas 111.2 degrees F., Lichtenstern 109 degrees and 109.9 degrees F. These high temperatures all occurred shortly before death. The highest recorded temperature with recovery is 107.6 degrees F.

Angina.—Dysphagia is early complained of, especially by adults. Early inspection shows a uniform redness of the fauces, uvula and tonsils. When the cutaneous eruption appears, the hard palate shows a punctate redness similar to that observed in the skin.

Other varieties of throat infection which may occur are the phlegmonous, the croupus or diphtheroid, and the gangrenous. Discussion of these types will be considered by others under pathology.

Tongue.—The tongue is almost pathognomonic. Early it is dry, swollen and tooth-marked, and has a grayish yellow coating in the center with red edges and tip. Later this fur desquamates, leaving the denuded scarlet-red raw surface with prominent projecting papillae, the so-called "strawberry" or "raspberry" tongue. These characteristics are most marked from the third to the fifth day. In the average case the tongue returns to normal about the seventh or eighth day.

Eruption.—The exanthem usually appears within twelve to thirty-six hours after the first symptoms of invasion. It reaches its full development in from twelve to twenty-four hours from its first appearance, and its duration in the average case is from three to seven days. The intensity of the eruption varies from a scarcely perceptible erythema to the color of a boiled lobster.

The exanthem appears first in the region of the clavicles, gradually extending to the neck, face, trunk, arms, hands, and last of all, to the legs and feet. The region about the mouth is seldom involved. In striking contrast to the swollen, red skin of the face, the region about the mouth appears like a broad white ring. This pale oval ring is exceedingly characteristic.

There is no description that will cover all forms of the eruption. Many anomalies are found. In general the patient appears to be covered with a uniform redness, but closer inspection shows that there are darker red puncta upon a reddish background. These puncta are best observed in the axillae, groins and roof of the mouth.

Variations are frequent and often puzzling. In mild cases the eruption may not be present upon the face and only faint on the trunk and other parts. If the rash is faint and scanty, it is usually most marked in the groins and axillae. In severe cases irregularities, both as to time of appearance and character of the eruption, are numerous. It may occur in patches like measles. It may be vesicular and occasionally hemorrhagic.

Intense burning and itching may be present during the height of the eruption.

Desquamation.—Shortly after the rash has faded, about the seventh to the tenth day, there begins an exfoliation of the dead epidermis. This is the stage of desquamation and is more characteristic of the disease than the rash itself.

Two types of desquamation are found. The first is the branny or flaky form and occurs chiefly on the face, neck, scalp and trunk. In the second type, separation takes place in large fragments or *en masse,* and occurs especially on the hands and feet.

A complete cast of a finger or of an entire hand may be formed.

Scaling usually begins in the areas where the eruption first appeared, the clavicular, and is completed last of all in the hands and feet.

There is no proof that scarlet fever is communicable during the period of incubation. In this respect it differs from measles. From the beginning of the invasive period, it is slightly contagious. The infection is most active during the height of the febrile period, from the second to the fifth day, and next to this, during the period of desquamation.

The duration of the infectious period is variable. In uncomplicated cases it is about six weeks, or until desquamation is complete. Too much importance is generally attached to the danger of the scales and too little to the mucous discharges. Early infections come chiefly through the nose and throat, and the late infections from prolonged desquamation, a purulent otitis or rhinitis, a pharyngitis, a suppurative adenitis or other complications. These discharges may remain contagious for months. Holt[15] cites a case where the disease was communicated from a nasal discharge after eleven weeks. He also mentions an outbreak of scarlet fever in a surgical ward following an operation for post-scarlatinal empyema. It is impossible to say at any time that absolute safety exists, but the more remote the time from the onset, the greater the likelihod of the infection having been extinguished. The isolation of patients until desquamation is complete is a good working rule, but every patient before dismissal should be examined carefully to see that there is no persistent discharge from the ears, nose, throat or glands.

ATYPICAL FORMS.

So far our attention has been confined to cases of average severity. No other disease furnishes so many deviations from the normal. Time, however, will permit me to mention these deviations only in the greatest brevity. I shall follow Osler's classification.[16].

Mild or Abortive Forms.—The child complains only of a slight indisposition which may not be sufficient to keep him from school. Examination may show a strawberry tongue with a very mild angina. The rash may be absent, or almost imperceptible These cases are responsible for most of the epidemics in schools. Nephritis may occur as a sequel.

Malignant Scarlet Fever.—This type begins with great severity. There is hyperpyrexia, urgent dyspnea, rapid feeble pulse and great prostration. These patients usually die in from twenty-four to thirty-six hours from acute toxemia.

Hemorrhagic Form.—This is a severe form, accompanied by petechial hemorrhages into the skin with hematuria and hemorrhage from the mucous membranes. This is the form frequently described by the early writers as epidemic malignant purpura.

Anginose Form.—Throat symptoms are prominent and appear early. The fauces and tonsils are swollen and covered with membrane. This membrane begins in the tonsil and spreads rapidly to the entire pharynx, nose, mouth and ears. Cultures from the throat usually show a streptococcus, rarely the true diphtheria bacillus. Necrosis may occur into the tissues of the throat and, with the separation of the slough, large vessels may be opened and fatal hemorrhage result. The profound constitutional symptoms are due largely to the general streptococcus septicemia.

COMPLICATIONS.

The complications of scarlet fever are exceedingly important from a symptomatic as well as from a prognostic standpoint. Time, however, will permit me only to enumerate and give a brief description of the most important ones, leaving their discussion chiefly to those who are to follow me.

These complications may be local or general.

Local.—Direct extension from the oro-pharynx.

Otitis media, the most common, occurs so frequently that in doubtful cases its presence is of some diagnostic value. It results from a direct extension along the Eustachian tube. From the middle ear the infection may travel to the mastoid cells, to the labyrinth or to the brain, producing meningitis, brain abscess or thrombosis.

Otitis should be suspected when, during the course of the disease, there are impaired hearing, earache and late rise of temperature. The diagnosis is confirmed by an examination of the drum membrane.

Ten per cent. of all cases of deaf mutism are due to scarlatinal otitis.

Rhinitis.—From the nasal cavity the infection may travel to all the accessory sinuses.

ADENITIS.—Cervical adenitis is present in every case, showing an exudative inflammation of the naso-pharynx, but suppuration is not common, except in the severe anginose form.

GENERAL.

NEPHRITIS.—No other infectious disease has so frequently a nephritis as a complication or sequel. It is by far the most important complication in scarlatina. There is an early and a late form. The early febrile albuminuria, common to all severe infections, is not especially significant. The late form, the typical scarlatinal nephritis, due undoubtedly to the toxins, usually occurs after all symptoms have subsided, the second to the fourth week. It occurs in from 10 to 20 per cent. of all cases, even when very mild. The clinical symptoms of a late nephritis are: (a) Edema, at first confined to the lower eyelids, but which later may become generalized; (b) changes in the urinary secretions; (c) effusion into serous cavities; (d) rise in temperature; (e) rapidly progressive anemia.

The duration of the average case is from four to six weeks. The great majority terminate favorably, about six-sevenths, but the disease may become chronic in form, or there may be an acute suppression of urine, uremia and death.

HEART.—There may be an endocarditis, simple or malignant; a pericarditis, serous or purulent; or a myocarditis. All have the symptomatology corresponding closely to the same conditions produced by other causes.

BONES AND JOINTS.—Two types are found, (a) multiple suppurative arthritis, a pyemic condition, very serious and usually fatal; (b) the so-called "scarlatinal rheumatism;" this second type occurs in about 2 per cent. of all cases, and usually in the second or third week. As a rule more than one joint is involved. It attacks by preference the small joints, such as fingers. The average duration is from three to four days to a week. The prognosis is good.

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[2] Quoted by Welsh and Schamberg, Acute Contag. Diseases.
[3] Acute Contag. Diseases, p. 359.
[4] American Journal of Med. Sciences, July, 1904.
[5] Quoted by Nothnagel's Encyclop., p. 408.
[6] Quoted from Nothnagel, p. 382.
[7] Acute Contag. Diseases, p. 347.
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EDITORIAL

MEDICINE AND EDUCATION.

Year by year the philosophical ideal of the unity of human knowledge and wisdom is being brought nearer. Time was when the school master and the physician each ruled in a separate realm, and the interdependence of physical and mental welfare was scarcely dreamed of, but the world does move, and the very considerable proportion of attention devoted to matters educational by the members of the American Academy of Medicine at their recent meeting in Boston indicates how far the gulf between these two professions has been bridged. Not only the education of those obviously abnormal, whose condition brings them within the range of discussions pathological, but the education of the average normal child in the public schools came in for prolonged consideration.

Dr. S. A. Knopf emphasized the importance of school physicians who should examine the children upon admission, inspect them daily and re-examine them periodically. He recommended providing luncheons for poor children, and separate classes, with specially trained teachers, for the atypical. Tuberculous children should be segregated in school sanatoria, and public school teachers who contracted tuberculosis in the performance of their duty should be pensioned. He spoke of the value of swimming and breathing lessons and of school gardens. Popular hygiene, physiology and prevention of infectious diseases should be taught in lessons adapted to the age and understanding of the pupils, and these lessons should include embryology and prevention of venereal diseases.

Dr. Dudley A. Sargeant also advocated the medical examination of public school children and would extend the same system to factories, department stores and institutions generally which employ a large number of persons. He believes that for the first seven or eight years of the child's life the family physician should have a close oversight over its growth and development. Thus would be avoided the defects and deformities resulting from incorrect school furniture, imperfect lighting and ventilation, etc. Instruction in the physiology of the generative organs should, in his opinion, be given at the approach of puberty by the family physician, the matter of venereal disease being plainly dealt with—both with girls and with boys. School athletics should also be subject to the advice of the physician.

Dr. Casey A. Wood spoke particularly of the care of the eyes of school children. The lighting of school rooms was a matter of the utmost importance. Artificial light, where it must be used, should resemble diffuse sunlight as closely as possible, and should shine on the child's work and not in his eyes. Electric light, judiciously arranged, is preferable to gas or kerosene, but unless so arranged is also capable of doing greater harm than either of the others. The tinting of school room walls is also a matter of no small moment, and each room should be adapted in this particular to the amount and quality of the light therein. Size of letters, width of printed column, color and texture of paper in books used, all come in for careful consideration, and no class room should be larger than 25 x 30 feet. Dr. Wood recommends as of most practical value, Allport's methods in the detection of diseases of eyes and ears. These methods were described in a paper to be found in the August number of PEDIATRICS. In the matter of desks, Dr. Wood favors the single adjustable desk with sliding top, adjusted at the beginning and in the middle of each school year. The length of recitations should vary from ten minutes each in the first year to a maximum of 45 minutes for the highest grades. No mental work should be assigned, out of school hours, to children under ten years.

Dr. G. Stanley Hall devoted much discussion to the vexed question of co-education, which he believed should not be continued after the age of twelve. Dr. William Smith was inclined to favor it, and Dr. Knopf would simply interrupt it between the ages of 12 and 17 years. This particular question is one so complicated by varying conditions and aspects that it is not likely to be categorically settled for some time to come, but the interesting, one might almost say inspiring, point in the whole discussion is that the educational forces are busying themselves with matters medical, and the medical profession is recognizing more and more its obligation as an educative force.

HEREDITY AND OPTIMISM.

When Dr. Holmes made that famous statement that the reformation of a man's character should begin with his great grandfather, he did not mean to imply that the inability to reach that great grandfather should imply a relinquishing of all efforts to benefit the great grandson. In the first place, the man himself will probably be somebody's great grandfather, and the beginning made with him will thus in time fulfill the genial autocrat's apparently paradoxical condition. More than that, there is a growing tendency to refuse the more pessimistic and fatalistic view of heredity, and to recognize, as did Dr. Hawley in his remarks at the meeting of the American Academy of Medicine, that the thing inherited is less a condition than a tendency to that condition, a tendency which may be effectually combatted and checked by proper environment and education. Against heredity may be arrayed: (1) Education, (2) the instinct of inititation, (3) the innovative force of the individual initiative. And a force which must be reckoned with is the tendency of Nature to "throw back" to the normal. As Dr. Hawley trenchantly puts it: "The tendency of the delinquent and the criminal, so far as inheritance is concerned, is to repeat the sins of the fathers *under like unhealthful and perverse conditions.*"

While admitting that in some instances criminals may inherit direct tendencies to crime, Dr. Hawley refuses to accept the views of such extremists as Lombroso without challenge. He believes that such views are not justifiable unless further evidence than has yet been adduced can be brought forward to show that the defects are "a positive inheritance rather than a result of defective development due to bad environing circumstances, drunkenness, etc."

Obviously the whole outcome of Dr. Hawley's contention is the necessity of preventing this repetition of unwholesome environment, and responsibility laid upon the public and particularly upon the medical profession to appreciate this necessity and to provide for it. Dr. Hawley further supports his views with the statement that the records of such efforts as have been made to rescue young children from the unpropitious atmosphere into which they have been born tend to show that the power of heredity in the production of crime has been over-estimated, and that abnormal physical, mental or moral development has oftenest resulted from abnormal environment.

Whether one can accept as fully as one might wish the relegation of unfavorable heredity to so minor a position, certain it is that hope, if hope there be, lies in the direction indicated, the beginning as far back as possible, with the child if not with his great grandfather.

ABSTRACTS

General Septic Peritonitis in Enteric Fever Without Evidence of Perforation.—Watson (Lancet, May 6, 1905). The author narrates an interesting case in which a boy, aged 9 years, suffering from enteric fever, developed on the tenth day of his illness evidences of general peritonitis. Laparotomy was decided on. The abdomen was uniformly distended, hard, and tender all over, scarcely moving on respiration, and dull to percussion in the lower half on both sides. Temperature 102.6 degrees F. and pulse 160. Tongue brown and furred; patient very restless with facies hippocratica. Incision was made in the middle line below the umbilicus. The peritoneal cavity was found to be full of thin, white, odorless pus, with flakes of lymph on the intestines; there were no adhesions; the intestines were not much distended but were red and dull in places. Some enlarged tuberculous mesenteric glands were found. There was no free gas in the peritoneum, nor was there any evidence of extravasation of intestinal contents. Death occurred seven hours after the operation. At the necropsy search was made for evidence of perforation, but none was found, and the bowel held water. When laid open the small intestine showed several early typhoid ulcers in the lower two feet and some swollen Peyer's patches. There were no sloughs. At one point the base of an ulcer seemed to be near the peritoneal coat, but the peritoneal coat was not visible from within at any point, nor was there any adherent spot which suggested a closed perforation. The large intestine was not involved. The spleen was very markedly enlarged. The glands in the mesentery were tuberculous, but there was no evidence of recent activity or of rupture of any gland. Cultivations from the spleen and heart's blood gave pure cultures of the typhoid bacillus. It seems not unlikely, the writer of the article remarks, that this was a case of pure typhoid peritonitis, and had it been seen earlier might have been treated successfully.

The Passage of Tuberculous Agglutinins and Antitoxins into Milk and Their Absorption by the Gastrointestinal Canal.—Figari, F. (La Reforma Medica, 1905, April 8). The author first discusses the work of other investigators. He divides his own investigations into three groups. The first concerns the passage of the tuberculous agglutinins and so-called antitoxins into the milk of actively immunized animals. Three cows were subjected to subcutaneous inoculation of repeated doses of tuberculous toxin and tubercle bacilli deprived of fat. Their blood serums and milk showed upon examination after six months of treatment fair agglutinating and antitoxic properties. Milk from several normal untreated cows showed no such properties. Milk from rabbits which had been passively immunized with the serum of the actively immunized cows also showed agglutinating and antitoxic properties. The second series of experiments concerns the question of the absorption through the intestines of specific substances present in milk fed to animals. The serum of a calf born of an immunized cow at birth contained but little agglutinating power and no antitoxic properties. After feeding on the milk of an immunized cow for four months its serum showed marked agglutinating and antitoxic properties.

In another calf born of a non-immunized cow similar effects resulted from feeding the milk of an immunized cow. Similar results also occurred in a sucking kid born of an immunized goat. In the third series the author shows that the milk of actively immunized cows when fed for two months to adult rabbits causes the development of moderate agglutinating and antitoxic properties in their blood serum. Such rabbits were able to withstand the injection of living virulent tubercle bacilli while control animals died. The author also relates a series of experiments on the feeding with the milk of an immunized cow of an adult female rabbit rearing six young animals, and the finding of agglutinating and antitoxic properties in the serums of the young. The author describes the precautions taken and the technique used in making the tests of the agglutinating power by the Arloing Courmonte method and the antitoxic power by the Maragliano plan of testing against fatal doses of tuberculin. Some of the author's conclusions are as follows: 1. Tuberculous agglutinins and antitoxins pass into the milk of actively immunized cows and goats and of passively immunized rabbits. 2. Calves and kids are capable of absorbing by the stomach agglutinins and antitoxins contained in the milk of immunized cows and goats respectively. 3. Rabbits immunized passively either by serum injections, or by feeding on immune milk, are capable of transmitting to their young by nursing the absorbed agglutinins and antitoxins.

Observations on the Thymus Gland in Children.—FORTESCUE-BRICKDALE (Lancet, October 7, 1905). The author contributes a very important paper on this subject, covering the results of his observations on fifty cases. These were taken consecutively in the ordinary course of pathological work. He found the average weight of the gland to be 128.7 grains

—the smallest, from a child, aged 3 months, weighing 30 grains, and the largest, from a child, aged 10 months, weighing 398 grains. He considers that the usual weight of the gland at birth is below 100 grains, and considers that larger glands are probably examples of some pathological condition. The normal functional extinction of the thymus gland takes place by a process of fibrosis. In various atrophic conditions this process occurs with great rapidity, so that an estimate of the nutrition of an infant may be formed by an examination of the thymus glands. He examined twelve thymus glands in marasmic infants, all under one year of age. They were all considerably under the normal body-weight. The average weight of the gland was 38.5 grains, the smallest being 20 grains and the largest 72. There were in all but two cases of marked fibrosis of the organ, the interlobulated septa being much thickened, as was the perivascular connective tissue. The lymphoid cells were also decreased in number, their place being taken by endothelial and young connective-tissue cells. The cortex and medulla could not be differentiated. In the two exceptions the thymus showed only very slight fibrosis in one case and none at all in the other, although the lymphoid cells were diminished. Regarding the fibrotic changes which occur in acute diseases, the writer had twenty cases of children dying from such acute cardiac cenditions as pneumonia, diphtheria, peritonitis, acute diarrhoea, and vomiting, etc. In six cases the fibrosis was either absent or very slight, in three it was present, but badly marked, and in ten it was considerable. In some of these cases other conditions might have accounted for the fibrosis, such as rachitis. When the gland is enlarged, certain symptoms are produced, such as laryngismus and stridulous breathing, and an enlarged thymus is often associated with general hyperplasia of the lymphoid tissues of the body, and not infrequently with rickets. He concludes that enlargement of the thymus and other lymphatic structures in the body may occur as the result of acute toxic absorption or a more chronic condition. He finds, as regards the pathological histology of the gland, that in some conditions, especially tuberculosis, cells with basophile or neutrophile granules seem to replace the eosinophiles. In congenital heart-disease eosinophiles are not found in the thymus. True hyaline degeneration very occasionally occurs in Hassall's corpuscles. Fatty degeneration of the cells is common, and appears often to affect the peripheral zone of the lobules.

Congenital Malformations in a New-Born Infant.—VALLETTE (Comité Méd. des Bouches-du-Rhone, May, 1905; Arch. Gén. de Méd., September 12, 1905, p. 2,352). The author gave an account of an infant who had the following abnormalities: a supplementary digit on the inner side of each little finger and joined thereto; webbing of several toes; segmentation of the large intestine; absence of the anus and lower part of the rectum; rudimentariness of the sigmoid curve, which ended above by a blind sac at the level of the left psoas; ascending colon and caecum situate on the left; absence of the transverse and descending colon. (Meeting June, 1905. Reference v. s., p. 2,360.) Pieri and Riss described the following changes found in a new-born child: absolutely imperforate anus; imperforate anterior extremity of the penile urethra; idiot hand on the left side, with absence of the radius and atrophy of the lower end of the humerus, and with the existence of only four fingers and their corresponding metacarpals; on the right hand there were only four fingers, but in place of the thumb was a small cutaneous tubercle.

Three Cases of Salivary Infection in the New-Born.—DURANTE (Arch. Gén. de Méd., August 29, 1905, No. 35, p. 2,190). The author describes three cases of this rare affection. The first was a parotid infection due to staphylococci, the second a sublingual infection due to Pfeiffer's influenza bacillus, and the third a submaxillary infection due to streptococci. Pus was present in the first two, but only a hemorrhagic infiltration in the third, the only fatal case; this case was the only one with pyrexia, but even here it was slight. The ages at onset were fifteen days, ten days, and fifteen days respectively. In all three the buccal route of infection seemed the most probable.

Treatment of Pertussis.—KRAUS (Deutsch. med. Zeitung, 1905, p. 827.) The writer recommends the use of a fluid, viz., vaporin, in boiling water to be used either in inhaler or the steam to pass into the atmosphere of the room, and believes that it diminishes the frequency and severity of the convulsive attacks. It was first introduced by Staedtler-Bern, and is composed of naphthalin 180 parts, camphor 20 parts, and eucalyptus oil and pine oil each 3 parts.

Eye Symptoms of Infantile Scurvy.—IRVING SNOW (Arch. of Pediat., August, 1905, p. 577). The author reports a case of severe proptosis of the right eye in a baby, aged 9 months. The cornea was cloudy; upper and lower lids were black and swollen, not covering the eyeball; no chemosis or discoloration of the conjunctiva; eyeball freely movable. There was moderate proptosis of the left eyeball, with swollen, discolored lids. Many other signs of infantile scurvy were present, and death ensued in twenty-four hours. On post-mortem examination of the right eye, a huge hematoma was found between the periosteum and bone of the orbit, filling the pyramidal space behind the eye and extending nearly round the whole orbit. This hematoma had become infected. A smear from the clot showed pus and a bacillus like the influenza bacillus. Sudden exophthalmos in a baby should always suggest scurvy. It may be the first indication. Its rapid onset indicates hemorrhage. The eyeball is freely movable, not anchored by inflammatory exudation as in orbital cellulitis. The author refers to a few similar cases.

Whey Mixtures in Infant Feeding.—H. T. MACHELL (Canadian Journ. of Med. and Surg.) advocates the use of whey as a basis for infants' food, in order to exclude the indigestible casein, the proteid of whey consisting of lactalalbumin, which does not tax the infant's digestion. The fat is added in the form of cream; milk-sugar is also added. By varying the proportion of these the milk can be modified after the plan just suggested by Rotch. An important detail is that the rennet of the whey must be destroyed by heating to 155 degrees F. before the cream is added to prevent coagulation; the heat must not be carried above 160 degrees F., or the lactalbumin will be coagulated. The smallness of this margin of temperature makes it imperative that the procedure be carried out by skilled persons.

A Case of Tetanus Neonatorum Cured by Subcutaneous Injections of Phenic Acid (Baccelli's Method).—FEDELE (La Pediatria, June, 1905, p. 451) made the following communication to the Congress of Children's Diseases, at Rome, April-May, 1905: A male infant, aged 13 days, born at term. The cord had been cut with a pair of common scissors without any antiseptic precautions. On the sixth day difficulty in sucking had been noticed, followed after two days by trismus and then general tetanic convulsions. The umbilical cicatrix showed a purulent secretion, in which Nicolaier's bacillus was discovered. After discussing the differential diagnosis between true tetanus, strychnine poisoning, eclampsia, tetanus, and cerebro-spinal meningitis, the author describes the cure. The infant was placed in a dark room and kept quiet, two warm baths were given daily and injections of phenic acid in sterilized oil 3 per cent. made into the buttocks. For the space of forty days a Pravaz syringeful was injected four to ten times daily, according to the intensity and frequency of the attacks. Neither carboluria nor albuminuria occurred. Recovery took place gradually in about forty days. An extensive bibliography on this subject is given.

The Action of Citrate of Sodium in Natural and Artificial Feeding.—R. Aibinder (La Clin. Infant., August and September, 1905, pp. 487 and 555) in her "Thèse de Paris," combats the views of Poynton and Wright, who consider that the citrate of sodium precipitates a part of the lime salts contained in the milk, and thus retards or diminishes its coagulability. The authoress, repeating the experiments of Poynton, but using bladders instead of test-tubes, arrived at the same results, and noticed at the same time a difference between the curd of unboiled and boiled milk, the latter being much more compact. She found that the addition to sterilized or raw milk of progressively increasing quantities of citrate of sodium did not in the least modify the coagulation of the milk. In order for the citrate of sodium to exercise its anti-coagulent action, it is necessary for it to act in the presence of gastric juice, which was replaced in the experiments by pressure and hydrochloric acid. The English observers explain this action by the precipitation of the salts of lime, but the citrate of sodium, on the contrary, dissolves them. The authoress was led to discover this error by Vaudin's demonstration of the existence of citric acid in milk in the form of alkaline citrates. It is sufficient to add chloride of calcium to citrate of sodium to show that there is no trace of precipitate; on the contrary, if the salts of lime are precipitated by the addition of ammonia, the precipitate is redissolved on the addition of citrate of sodium. Arguing that if the addition of citrate of sodium in presence of gastric juice retards coagulation by means of the precipitation of the salts of lime, these salts ought to be found in the coagulum, experiments were made in which only a faint trace of salts of lime was found. On the contrary, almost all the lime was found in the whey. This proves that the citrate of sodium acts by suspending the lime in such a way that it cannot exercise its influence in promoting the coagulation of the casein. It renders the digestibility of the curd more easy and may be successfully employed, not only in artificial feeding by cow's milk, which normally contains more lime than human milk, but also in maternal feeding when the mother's milk is not well borne. A number of cases are given, a solution of 1 in 60 in doses of a coffee-spoonful to a soup-spoonful being given with each bottle or with each feed. The solution should be always freshly prepared and with distilled water.

The Chemistry of Cow's Milk.—Van Slyke (Arch. of Pediat., 1905, p. 508) states that analyses of milk furnish little real information, unless something is known of the history of the samples. Analyses made in other countries may have little or no value when applied to milk produced in the United

States. Normal's cow's milk varies very much in composition. The percentage of water varied from 84.6 to 88.2 in different breeds of cattle, from 82 to 90 in single milkings of individual cows, from 84 to 89 during the period of lactation, from 86 to 88 in the milk from herds of cows; average milk contained 87 to 87.25 per cent. The percentage of fat ranged between 3 and 5 in the milk from herds of cows, from less than 2 to over 10 in single milkings of individual cows. The true average is about 4 per cent., but varies in different breeds from 3.36 in Holsteins to 4.44 in Shorthorns and 5.60 in Jerseys. The percentage increased somewhat as lactation advanced up to ten months, and increased with decrease in the intervals between successive milkings. As usually found, the foremilk was the poorest and the strippings the richest in fat. The percentage also varies in the milk from different quarters of the udder. The nitrogenous substances are casein, albumin, globulin, and galactase. The casein is combined with calcium and should be called "calcium casein." It exists in milk in the form of solid gelatinous particles in suspension. In the process of curdling it is converted into casein lactate. By adding acid to milk the casein is set free from its combination with calcium. If more acid is added, it unites with the casein forming a salt of casein. Such salts are soluble in excess of acid. Dilute alkalies act on free-casein and its acid salts and form compounds soluble in water, such as plasmon nutrose, santogene, eucasein, galactogene, etc. The skin formed on the surface of milk heated over 140 degrees F. is due to calcium casein, and not to albumin. It is a kind of evaporated milk. Calcium casein is coagulated by rennet, forming paracasein, or, more properly, calcium paracasein. This is merely a physical change depending on the presence of soluble lime salts. In coagulation by acids a new and different body is formed—a salt of the acid. Alkalies, alkaline salts, and common salt retard rennet curdling. Lime-water, added in quantity sufficient to render the milk neutral or faintly alkaline to phenolphthalein, causes the formation of a basic calcium casein, which is not acted on by rennet even in the presence of soluble lime salts. Rennet coagulates milk best at 106 degrees to 108 degrees F., and less completely at higher or lower temperatures. The curd is softest at high and low temperatures of coagulation. Galactase is a ferment, somewhat like pepsin, and is present in very small amount. Milk globulin is only present in minute quantity. Milk albumin and calcium casein vary much in their relative proportions, but on an average there is one part of albumin to 3.6 of casein. The total albumin varies from 0.5 to 0.9 per cent.; average 0.7 per cent. The casein varies from 2.5 to 6 per cent.; average 3.2 per cent. The percentage of fat in milk can be easily estimated by a small Babcock tester. The total percentage of casein and albumin is from 0.10 to 2.05 per cent. less, the difference increasing with the rise in fat percentage.

Adenoids in Infants.—MOURE (Journ de Méd. de Bordeaux, August 27, 1905). These are often unrecognized, as the typical facial aspect is undeveloped; the resulting defect of hearing is not usually appreciated, or advice is not sought, from the idea that the hearing will improve with age. The symptoms that attract attention are—sleeping with open mouth, snoring, stridor or raucous respiration, inability to take the breast except for short periods. Difficulty of breathing varies with the weather, being worse in damp weather and consequently during a winter and spring, improving when the weather is dry or hot. The voice is hoarse, like a frog's croak. The diagnosis from chronic coryza, which is rare in infants, is founded on the absence of discharge, and from syphilis and tubercle by the absence of constitutional symptoms. Difficulty of treatment results on the infant nasopharynx being too small to admit of digital exploration, so that it is impossible to ascertain that everything has been removed at one operation. An instrument is recommended that secures the removal of detached fragments and that also consists of curetting. Trouble in breathing or feeding may necessitate operation at the age of two or three weeks, otherwise operation may be postponed till the seventh or eighth month, care being taken to avoid a time when the symptoms are acute. It is advisable to warn parents that the operation may have to be repeated when the child is four or five years old. In fact, it is better to postpone operating till one complete operation can be performed.

Tubercular Arthritis in Children.—BROCA (La Tribune Médicale, September 9 and 16, 1905). In the paper prepared for the International Surgical Congress at Brussels surgical interference is deprecated. The disease is general rather than local. As soon as possible, consistent with immobilization of the joint, open-air exercise should be taken, and even when the implication of one of the lower limbs prevents walking the other limbs can be exercised. Though residence at the seaside is advantageous, it is not indispensable. Hydrarthrosis of the knee in children, not due to injury, is of tubercular origin. After puncturing, to verify the diagnosis by the microscope, the fluid should be evacuated, and 10 per cent. iodoform ether injected and the limb put up in plaster; this allows the patient to be out of bed in from six to eight weeks. After not less than six months the splint may be dispensed with, as the joint is stiff, but not ankylosed. From the very first plaster of Paris is better than silicate of potassium, leather, or celluloid for immobilizing the disease. This procedure, even when an anesthetic is used during the application of the splint, entails less risk of general infection than an open operation or gradual rectification, though a rise of temperature for some days is usual. In disease of the spine or upper limb the use of plaster splints reduces the confinement to bed from two years to six months. As an adjuvant to the use of plaster splints local pressure is beneficial; a window is made in the splint and the affected joint is covered by cotton-wool, firmly bandaged. Every fortnight the joint is examined, and, if required, counter-irritated by iodine or mercury ointment. If the swelling of the joint does not subside, injection of iodoform ether is of service. But it is not desirable to inject strong solution near the joint to act as counter-irritants. Arthrectomy, even of the knee or elbow, is seldom satisfactory; excision is not much better. The most conspicuous indication for operation is the existence of localized accumulations of pus, with or without the presence of fistulæ; in neglected cases septicemic infection may occur, calling for prompt operation to remove the infected osseous foci. The joints should be immobilized as long as swelling and spontaneous pain persist, though with every care temporary relapses are usual before permanent use of the limb is secured. Children are but little tolerant of forced manipulation.

Congenital Flat-Foot.—PRINCETEAU (Journ. de Méd. de Bordeaux, August 6, 1905). The rectification of the deformity was secured by two operations. The first consisted in section of the tendo achillis, and a wedge-shaped piece of bone from the tibia of a cat grafted into the space between the inner borders of the scaphoid and astragalus. The second operation had for its object the shortening of the external border of the foot. The astragalo-scaphoid joint was opened and the foot put up in plaster. Skiagrams ....the grafted bone in position. But, as this is the first operation of the kind, some years must elapse before it can be decided that the graft is permanent.

Sarcoma of the Vagina in Infants.—AUBERT (Rev. Méd. de la Suisse Romande, August 20, 1905). A clinical description is given of the author's case of proliferating sarcoma which filled the vagina with numerous soft, friable, pedunculated masses. Seventeen cases from young children are collected. The usual initial seat is the anterior wall of the vagina, with rapid invasion of the bladder and urethra, whereas in adults the most common seat is near the neck of the uterus. The condition is usually at first diagnosed as simple vaginitis or benign warts. Israel successfully removed the uterus and vagina by the sacral route. Schuchardt removed the lower half of the posterior vaginal wall without a return in three years. These two cases are exceptions, as usually the cases run a rapid course, whether operated on or not.

Popliteal Aneurysm Cured by Hunter's Operation.—OWEN (Lancet, October 21, 1905) records the exceedingly rare condition of popliteal aneurysm in a boy, aged 15 years. About eleven months before the patient broke his left femur a little above the knee, according to his parents' statement, and this was borne out by an X-ray photograph shown to Owen. Now and then the patient felt a strange "click" in the knee, and he said that sometimes the muscles of the thigh contracted with so much vigor that he could not keep the leg straight and the knee sometimes remained rigidly bent for twelve hours. On examination a popliteal aneurysm was found filling up the hollow at the back of the knee and bulging up among the hamstring tendons. Compression on the femoral artery caused the swelling to disappear, and on removing the compression the blood slowly filled up the sac again with such force that it seemed ready to burst. The boy experienced considerable throbbing behind the knee, but this did not trouble him. Operation was resolved upon, and, accordingly, as there was not room to tie the popliteal, the femoral artery was ligatured in Hunter's canal. Two silk sutures were put on and the artery divided between them. Rapid recovery took place. The causes of aneurysm in early life are: (1) Softening and yielding of the arterial coats around a septic clot which has been cast adrift from a valve in the heart, (2) stretching of a vessel at an atheromatous patch, (3) damage to the artery by direct injury. Aneurysms, however, are very rare in children.

Removal of a Large Pin From the Lung by Transpleural Pneumotomy.—RUSSELL AND FOX (Lancet, September 9, 1905). The authors describe the case of a boy, aged 12 years, who got a pin three inches in length into his trachea. The pin, three weeks later, was found to be lying in the left bronchus, the head lying two and a half inches below the bifurcation, the point projecting into the trachea. Eventually it became imbedded in the lower lobe of the lung. A curved incision was made, and a portion of the left eighth rib was removed. The pleura was then opened into. The lower lobe was grasped near its root and drawn towards the opening. The head of the pin was located, and an incision made in the lung over this spot. The pin was then easily withdrawn by means of a pair of sinus forceps. The patient made a fairly rapid recovery. The case affords a capital illustration of the value of X-ray examination to the surgeon.

Infants Responsible for Endemic Yellow Fever.—Marchoux and Simond (Annales de l'Institut Pasteur, Paris). This final part of the official report of the French commission to Brazil fills 45 pages and is accompanied by 19 full-page plates showing the pathologic anatomy of yellow fever in various organs. The authors ascribe the perpetuation of yellow fever in endemic foci to the infant population. In a climate which allows the *Stegomyia fasciata* to flourish all the year around by the favorable conditions of temperature and moisture, when yellow fever is introduced for the first time an extensive epidemic results, as no one is immune, causing many deaths, but leaving the population almost entirely vaccinated and immune to the disease. The few people who escape the epidemic furnish later the isolated, so-called sporadic cases which form the connecting link between one epidemic and another. This contingent would soon be exhausted, however, were it not for the births. A new contingent is being constantly furnished by the newborn infants, and this infant population, constantly renewed, is the principal element which creates and perpetuates endemic yellow fever. On account of the mildness of the disease in children, the disease in the children escapes notice, and this explains why years pass after a violent epidemic without the development of any recognized new cases. The disease is supposed to have died out, when in reality the town is an endemic focus. This is proved by the infection of newly arrived, non-immune aliens, who contract the disease in the severe type which it assumes in the adult. These views are sustained by the experiences with yellow fever at Guadeloupe and elsewhere in the Antilles. A mild disease has long been known there among children which has never been recognized as yellow fever, principally because none of the adults contract it. The adults are all immune to yellow fever and the children are the only ones who take it. As it usually has such an attenuated course in them its true nature has not been recognized. In the endemic foci, therefore, it is the floating foreign population which furnishes the contingent for typical yellow fever. When this floating population is increased by public works, then formidable and deadly epidemics of yellow fever break out, such as was observed at Santos when the new harbor was built. One of the conclusions drawn from the facts presented is that a city in which the adult alien population furnishes the majority of cases of yellow fever is an endemic focus whose permanent inhabitants are all immune. If, on the other hand, a group of aliens escapes the disease when it is epidemic it is safe to conclude that they come originally from some locality where the disease is endemic. This explains the supposed immunity of the blacks. In conclusion Morchoux and Simond protest energetically against the assumption that it is possible for the stegomyia to become infected elsewhere than from man or that the yellow fever virus can affect man without the intermediation of the mosquito. An official or a physician, they say, who is not thoroughly convinced in respect to the exclusive role of the mosquito in the transmission of yellow fever is incapable of organizing effectual prophylaxis, and endangers the colonists, the soldiers and other people in his charge. Sanitation of an endemic focus or changes in its population, climate or in other conditions which have rendered it favorable for the stegomyia may exterminate the disease and free the place from being an endemic focus. On the other hand, a place in the mosquito zone where the disease has hitherto appeared only accidentally, as the stegomyia was imported, if conditions favoring the growth of the stegomyia develop, may become an endemic focus at any time. The microscopic pathologic anatomy of yellow fever is that of a generalized fatty degeneration, a diffuse steatosis. The reason why Petropolis is exempt from yellow fever, although only 8 miles from Rio, is its altitude, with the cool nights. The stegomyia may be brought up on the trains, but it is rendered torpid by the coolness and neither lays eggs nor bites. Even infected mosquitoes soon lose their infecting power in the chill of the nights. In Rio Janeiro the present conditions of distribution of the drinking water favor the proliferation of mosquitoes, and a number of remedies are suggested, among them that sea water—which does not attract mosquitoes—should be used for industrial purposes, fountains, etc.; that the trees in the gardens be freed from the parasites of the bromelia genus, and that the ornamental vases on houses, etc., be filled with cement. As the number of places where the mosquitoes are liable to lay their eggs diminishes, it will be easier to keep watch over those that remain. After a few years of work by the sanitary brigades the entire species of *Stegomyia fasciata* can be eradicated from the city. And this is the only certain means of stamping out yellow fever. The general conclusions of the entire research are recapitulated at the close of this final part of the report.

Diphtheria Antitoxin Effective in Scarlatina.—Lopez (American Medicine, January 27) states that in his experience early curative doses of diphtheria antitoxin administered in scarlatina abort the disease, curtail suffering and lessen the risk to the patient, one dose of 2,000 units being sufficient in the average case of sore throat due to bacterial infection to effect a speedy cure. He also finds the serum equally effective in all anginas, be they scarlatina, tonsillitis, quinsy, etc., through neutralizing the toxins and reducing the fever and local congestion which contribute to the patient's suffering and the element of danger. There are no contraindications. Lopez says that it should be remembered that the largest quantities of serum the most severe cases may require, from 20,000 to 100,000 units, are not depressing to the heart, are not attended with any bad results or sequels and are without a single element of danger.

Rupture of Child's Urethra.—Broca (Annales des Mal. des Org. Gén.—Urin., Paris) reports a case and discusses the indications. Immediate suture is required, but even the most careful technic does not insure against stricture later. He has had cases completely successful and others in which the patient returned with stricture. Speedy and very serious stricture may develop after apparently trivial injury without perineal tumor and with very little dysuria and a few drops of blood.

Warm, Moist Air in Diseases of Children.—Kilmer (Med. Recd.). The author advocates the use of warm, moist air in the treatment of children suffering from croup, acute bronchitis, asthma, pneumonia, diphtheria, laryngitis, whooping-cough, tonsillitis, nephritis, sprains and acute articular rheumatism. The apparatus employed by Kilmer consists of a tin funnel chimney; a firepot, containing a Bunsen burner for gas and an alcohol lamp; a water boiler with a cover; a jointed tin tube in two sections with a gauze chamber, and an asbestos tube. It is impossible, says Kilmer, to upset this apparatus. It can be kept going for weeks, if necessary, with no attention save the occasional addition of water. The firepot may be turned upside down and the burner will not drop out. The apparatus may be carried from place to place while lighted, with no danger of setting fire to the house, scalding the patient or burning the hands. The method of using this apparatus for supplying warm vapor or hot, dry air is described in detail.

Pseudo-Uremia of Childhood.—Birchmore (Med. Rec.). According to the author this disease is rare and its symptoms misleading. In those cases which came under his immediate notice the diagnosis of uremia had been made by skillful physicians. All the cases began with headache and chill in the older patients, with spasms and crying fits in the younger ones, followed by a sleep or lethargy sufficiently alarming to require the attendance of a physician. The skin was dusky or bluish in tinge. The pulse averaged 59, with a temperature of 102.4 and 103.2. In all the cases the pupils were much contracted. A hypodermic injection of sulphate of atropin to stimulate the respiratory center was at once given, and one of strophanthin in preference to digitalis, to steady the heart.

The breathing improved as soon as the atropin began to take effect. When possible, an effervescing saline cathartic was given, the dose being repeated in half an hour, if necessary; this was followed in every case first by an evacuation of the bowels, and, secondly, by a disappearance of all the symptoms within ten hours. Birchmore is convinced that there are many other cases of indigestion or of faulty digestion in which the poison which overpowers the respiratory center is produced in sufficient quantity to do serious mischief.

Postmortem Study of Tuberculosis in Children.—(Jahrb. f. Kinderheilk.) This communication from Escherich's clinic at Vienna reports the finding of the prosector, Ghon, in 401 autopsies of children. Of this total, 160, or 40 per cent., were found affected with tuberculosis. Death was due to the tuberculosis in 100 per cent. of the young infants, in 68 per cent. of the children up to 2 years old, in 65 per cent. of the children up to 5 and in 47 per cent. of the children between 10 and 14. The tuberculosis was found active in 40 out of the total 160, inactive in 10 and healed in 27. No signs of healed lesions were found in any children under 3, but the proportion increased progressively with this age upward to 47 per cent. of the 17 children between 10 and 14. The findings confirm those of Naegeli and others in regard to the increasing frequency of tuberculosis as the individual increases in years, with a corresponding decrease in the mortality of the tuberculosis. Fully 60 per cent. of the children who died from tuberculosis succumbed to tuberculous meningitis, but in 64 out of 67 such cases the meningitis was secondary to tuberculosis of some other organ, subacute or acute general tuberculosis. In only 27 per cent. of the entire 110 cases in which death had been due directly to the tuberculosis were the lesions those generally observed in adults; all the others were those of tuberculous meningitis (60 per cent.) and miliary tuberculosis. The mesenteric glands were found affected in only four instances. There were no indications of primary intestinal tuberculosis in any case. The article compares the findings recorded with those of Naegeli and other investigators, the concordance in the results being striking.

Post-scarlitinal Lymphadenitis.—SCHICK (Jahrb. f. Kinderheilk). Schick describes the glandular affection which frequently appears in the third or fourth week after the first symptoms of scarlet fever. The glands involved are in the submaxillary region, and their inflammation and tumefaction are the most frequent cause for the recrudescence of fever during convalescence. This lymph-adenitis enables a retrospective diagnosis of scarlet fever. The treatment found most effectual was cold applications at first, with hot applications later if the affection progresses, and incision in case of fluctuation. The general health does not seem much affected, frequently in marked contrast to the high fever. In a few cases the child seemed sick, the symptoms suggesting, to a certain extent, those of scarlatinal nephritis. He has observed seventy-one cases of the lymphadenitis in 990 patients with scarlet fever during the years 1902-1905. Usually but one of the submaxillary glands is affected.

Sudden Death in Course of Eczema.—BERNHEIM-KARRER (Jahrb. f. Kinderheilk). The author discusses the mystery of the sudden deaths of children with eczema of the scalp and face. In one such case the autopsy revealed an unsuspected streptococcus focus in one lung, the action at a distance of these germs having induced slight endocarditis and pleural effusion. In another case an infant with eczema exhibited attacks of heart weakness, possibly from a similar action of the germs on the heart muscle. Another child of eleven months was in his care for recurring eczema of the scalp and face. The child was brought to him, after two months' absence, on account of a new patch on the cheek, and he was impressed with the dull look in the eyes, but nothing abnormal could be detected in lungs or heart. The cervical glands were swollen. He ordered a salve ichthyol and zinc oxid. The child seemed unusually quiet and was found dead the second morning. Staphylococci were discovered in the cutaneous lesions and in the internal organs. Their numbers were not large, but it is possible that the eczema may have generated toxins, similarly to extensive burns, which may have induced an actual toxic form of staphylococcus mycosis. This assumption was confirmed by a number of experiments on animals. Infection with the staphylococcus alone did not cause by any means such severe symptoms as when the staphylococcus infection was supplemented by a cutaneous lesion, such as a croton-oil blister. The heart seemed to suffer particularly in these cases. The researches reported emphasize the importance of careful oversight of the heart action in cases of extensive eczema. Possibly the blood pressure might afford useful information.

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THE PRINCIPLES OF TREATMENT IN DISEASES OF CHILDREN.*

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Knowledge of principles of therapeutics adapted to the conditions of childhood is of far greater importance than to those of the adult. Differentiation must be finer; greater niceties of physiologic reasoning and more caution and exactitude must be exercised because of the persistence of embryonal features not yet fully understood or appreciated. Scientific medicine is based upon adult findings. Pediatrics is still practically a modification of these designed to fit as well as possible.

The problems of childhood are far more complex than those of adults, if the sphere of psychoneurosis be excluded. The key to success in treatment lies in acquiring an intelligent appreciation of the intricacies of infantile, childish, and adolescent aspects of growth, change, derangement, and capabilities for repair. Nothing can be more worthy of our best efforts than to acquire facility in the treatment of childish ailments. Errors and omissions in combating morbid forces in them impair for all time constitutional integrity. They cannot be condoned or adjusted as are similar omissions or perversions assailing the adult.

The child is a vitalized mechanism of indescribable delicacy. If disorders pass unchecked into disease the effects are both direct on structures, and indirect on development, bearing heavily upon conformation, distorting organs, checking growth in the brain and the controlling centres. Attention given to the correction of childhood's maladies, therefore, cannot be too urgently encouraged.

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*Brit. Jl. Chins. Dis.

The cells of the child are in process of almost primitive evolution. Selective affinity is not yet developed; resistance is low; irritability, conductivity, and other inherent properties are unstable. Resistance is so small that even a slight excess or prolonged continuance of an irritant, whether it be photic, thermic, chemic, toxic, or other, may produce violent perturbations and readily cause such alterations in cellular integrity as to induce profound and lasting damage. The balance of the vasomotor mechanisms in the young has not yet been developed to a degree which enables them to sustain safely the effects of over-much interference. The cerebro-spinal nerves respond so swiftly to irritants that reflex potentials may readily become overwhelming. Hence, *e.g.*, convulsions follow relatively slight causes.

The *elemental principles* by which we can be guided in combating the disorders of infants and children should be thoughtfully formulated for daily use. We can at least determine the form and directions which deviations from normal functionation will probably take and outline safe measures by which they can be modified or overcome.

The keynote of pediatric medication is the encouragement of development, the maintenance of auto-protective forces. The healthy infant is a being whose organic development has proceeded on normal lines and is in cellular equipoise, a product of the resultants of sound heredity, wholesome antenatal conditions, and suitable environment maintained within reasonable limits. Small variations are, however, permissible. We are usually compelled to estimate the status of development chiefly upon inferential evidence. We may expect little more to guide us than the testimony of our trained observation until we shall know more of physioligic variants and the potentialties of persisting embryologic factors. Even where this general survey furnishes all that can be reasonably expected there remains a larger source of functional derangement of which we have had, as yet, indicated only a few leading facts and principles, viz., as to those of the internal secretions, the regulative nervous mechanisms, and the processes of oxygenation.

Bio-chemistry is a field from which we may hope for practical therapeutic hints of far greater significance than from pathology as it is generally conceived. To secure a clear comprehension of indications the avenues of knowledge are hedged about with difficulties especially because physiology has not yet furnished us with sufficient working data.

In the use of drugs, or the explanation of their effects, we are compelled constantly to fall back upon a careful judicious empiricism. When we are able to *know* that a chosen medicine or preparation *does produce* certain specific and uniform effects, we shall then be able to offer explanations of its specific and individual applicability, next to anticipate and formulate reasons for deviations and exceptions. Bio-chemistry may then explain these as it becomes elaborated and illumine our dark corners by new phases of truth.

An obvious and imperative need is a fuller and broader study, a clearer interpretation, of existing data. *We are too eager for new facts adequately to sift, correlate, and test those already in our hands.* Thus the status of organic and structural development, especially of the blood and blood-making organs, the ductless glands, variations in oxidation states in protoplasm, is plainly of the utmost importance in decisions and for outlining treatment. There are numerous simple as well as complex processes set in motion by abnormal conditions, some of which are, however, advantageous or economic.

In the complex reactions to injurious agents, such as of inflammation and infection, *the organism needs conservation of its own protective substances.* These are obtainable through a maintenance of vascular balance, vasomotor tone, integrity of circulation in the spinal segments, activity of leucocytes and lymph-formation, and of the adrenal system.

These protective reactions are displayed beautifully in the establishment of natural or acquired immunity. In the instances of favorable pathologic reactions we have physiologic prototypes such as in modified growth and regeneration. Phagocytosis, pointed out by Metchnikoff and his followers, emerging triumphantly from the animadversions of the critic, is the source of much light.

The blood-fluid plays a most important *role* in phagocytosis, in that it influences invading bacteria so effectively that the phagocytes can more easily digest them. The production of antitoxins and anti-bodies is thus shown to be the result of special adaptations of vital mechanisms, whereby the balance of nutrition is maintained. Under abnormal conditions there are noticeable differences between normal and pathologic manifestations of function which thus become inefficient, imperfect, diverted from their purpose.

As there are variants in the action of purely regulatory mechanisms, so also are there degrees and individual differences in the powers of adaptation and in protective reactions. These adjust themselves in diseases and either forbid or permit continuance of function, hence of life.

It has, therefore, become clear that we are now in a different position in our search for remedies than we were before these facts became established. In the selection of the means to control processes we have long exhibited too great a tendency to be influenced in our belief by waves of extra-professional or of popular opinions. We cannot be too cautious, for example, in accepting the recommendations of manufacturing chemists, who add much to the knowledge, distinctly too much, pouring out a flood of modified findings of established facts, with a new one here and there, all of which may well obfuscate the most vigorous intellect. Their findings, useful in part, yet come in such an overwhelming mass that we would perhaps be better off without them. The research scholar in the laboratory, moreover, too often permits his zeal to distance discretion, to run his lines so fine as to lose sight of many important principles by the way.

It is equally unwise to bow to the clamor of reactionaries within and without our ranks. We have already learned much from, and shall never cease to benefit by empiric data. The boldness of the practising physician in putting his courage to actual bedside tests has furnished the real groundwork for practical medicine. His observations are of priceless value and could be more so if only he exhibited greater patience and accuracy in recording.

It is admitted that for the safe and effective treatment of the sick we have improved little upon various methods long ago established. In the treatment of infantile ailments a potent cause for high mortality is over-much interference. How can it be otherwise? Dr. Frank Billings in his presidential address (Amer. Med. Assoc.) estimated our knowledge of the physiologic action of drugs to be clear in only two, quinine and mercury. Dr. John H. Musser, his successor in the presidential chair, in a recent address before a Philadelphia pharmaceutical audience, declared that we do not yet know anything accurately of the action of drugs. Thus these men would obliterate even the last vestiges of our so-called "scientific therapeutics." Many other competent clinicians have spoken in the same vein. Empiricism is therefore our sheet-anchor. It is only where clearly defined morbid conditions, positively known to be met favorably by a given remedy, are present that we are on safe ground. But how frequently are we misled by objective symptoms, often our only guide in young children. Plainly great prudence should be our rule in the use of remedies until both symptomatology and therapeutics shall have been placed upon a more solid foundation.

Will such time ever come? I firmly believe that it will, and moreover, that our own country has already contributed the foundation stone for an entire transformation of present conceptions both as to the pathogenesis of disease and its rational treatment. I refer to Sajous' work on the internal secretions and the principles of medicine (1903). Indeed, say what we like, but wherever we turn we are brought face to face with the *problems of the body's auto-protective resources, the vis medicatrix naturae.* Here is our touchstone, or guide, our *credo*. We may speak of invading bacteria, but unless we know *how* they overcome, through their toxins, the body's defensive mechanisms we shall never understand the pathogenesis of disease due to them; we may speak of the bactericidal properties of the blood and of its leucocytes, but unless we *know how* these bactericidal agents can be increased in the blood at will we shall never be able to command their destructive action. These are precisely the principles which Sajous has given in outline in his first volume, but which are worked out in detail as regards each disease and each drug in the second, soon to appear. I am not alone in the belief that his labors will eventually place medicine on a footing at least as sound as that of surgery. His views are steadily gaining ground both in this country and in Europe; I do not fear to state my confidence that the general principles he has introduced will ultimately serve to place our country in the van of scientific nations.

The hygiene of sick infants is worthy of profound study and should be formulated on lines of exactitude and science. It is usually taught in a most haphazard fashion. The concept of each student is marred by personal taste, preference, or accident. It is only possible here to allude briefly to a few points or principles. Infants demand the maximum of quiet, a uniform temperature, the utmost cleanliness of air, simplicity of diet, freedom from irritants of all sorts, plenty of light, and the least possible disturbance.

Young children are extremely susceptible to the reverse conditions, but vary enormously in their adaptability and capacity for enduring irritants. Hence it follows that many times when we cherish the conviction that our health-restoring measures have prevailed the sick infant has survived in spite of them, or it may be that those factors we could not control, but deplored, were really less hurtful than we feared.

For instance, let me cite a fragment of my personal experience in dispensary work at the Children's Hospital in Philadelphia, where for twenty-five years I have held clinics in the cold months. During that time I have had under my care some thousands of young children suffering from bronchial and pulmonic troubles, and others ill from diverse causes, and all presumably susceptible to the harmful effects of cold. It is difficult to recall instances of death or serious increase of the existing disorders from the induction or aggravation of respiratory complications. Yet these little ones were brought back and forth in all kinds of wheather. Exposure to air, especially the cold, is viewed with greater liberality now that a more exact knowledge prevails of the value, rather than peril, of the agent. The physician has conspicuous need of an accurate knowledge of the principles of bodily hygiene to use in the work of each day. How to get it is not clear, so rarely is it taught practically or systematically. Few take advantage of such opportunities as come their way. Most of us cherish the erroneous conviction that our chance reading and the utilization of casual opinions will suffice.

Diet is a long story. The feeding of infants is now admitted to be more important than any other agent in growth, development, and repair. This one achievement of the profession, the modern scientific modification of milk and all that appertains to improvement in milk supply and transportation, is an evidence of enlightenment beyond praise. It has reduced by one half or more the difficulties of treating infantile disease. This enlightenment still leaves much to be desired so far as it affects the community.

It is conceded by physicians that the life, growth, and maintenance of health of infants depends more largely on the quality and condition of the milk than any other one factor. It is now demonstrated beyond peradventure that *thoroughly good milk can be supplied provided it is demanded and provided people will pay for the inevitably increased cost.* In the face of all this, the public, both those of moderate and of ample means, exhibit the most astonishing and deplorable indifference, often active opposition, to a reasonable increase in price. This unfortunate attitude stands as a barrier to the best efforts of the profession in one of its most vital postulates. By this difficulty offered to scientific conviction and teaching the lives and health of a large proportion of our embryonic citizens are yearly sacrificed. The waste of money values alone is thus incalculable.

The remedy is a constant crusade on the part of the physicians everywhere. Boards of heath and inspectors of dairies are found to be capable and willing, but zeal must be supplied by the profession, one and all. Dairymen are not to blame if the consumer demands the cheapest product; they can scarcely be censured if the buyer will persist in selecting the cheapest grade of milk and is only critical of the fat, not of the bacterial or filth, content. Just here is it pertinent to record an observation which much experience has forced upon me; viz., that the pronounced advances made in the hand-feeding of infants tend to encourage neglect on the part of mothers to suckle them. Among the well-to-do classes omission of breast-feeding is increasing. Some physicians, many perhaps, encourage mothers to wean their babies without sound reason for doing so, often merely maternal selfishness or vanity. This vice is extending to the working classes. More and more women find it easy to confide their babies to day nurseries or professional caretakers, and to supplement their husband's income by work in shop, factory, or the like. Meanwhile benevolent organizations supply milk or milk mixtures at cost which thus unwittingly become great agencies in prostituting the sacredness, the wholesomeness, of the home.

Dietetic regulation is now recognized to be capable of overcoming a large group of functional disorders which, when they persist, pass into serious disease. Digestive disorders in infancy form the foundation for many infections of the gastro-intestinal tract, which in turn invite severe infections—*e. g.*, tuberculosis, acute toxemias. Nutritive defects are at the basis of neuroses and psychoses, oftentimes the sole assignable cause. Cure of those childish nervousnesses so common, but little appreciated by parents, or even some physicians—fidgetiness, fear, night-terrors, insomnia, spasmodic disorders, chorea, tics, eclampsia, hysteria, neuroses, and neurasthenia—is accomplished in great part by full attention to corrective dietetics. It is wise to accept the nutritive fault as the basis of treatment till further light is shed on the problem.

Careful dietetic treatment of subacute and chronic disorders of digestion and their endless consequences cannot be over-esteemed though it is often over-estimated. However efficacious it may prove in many instances, full control over the patient cannot always be exercised for the length of time, often months or years, admittedly essential to secure full success. In a recent paper L. Emmet Holt (*Pennsylvania Med. Gazette,* April, 1906), makes the emphatic assertion that in chronic digestive disturbances in children beyond the age of infancy careful dietetic treatment is the only measure which accomplishes anything permanent, admitting at the same time there is demanded an extended period of absolute supervision.

Where excessive intestinal fermentation occurs local flaccidities and atonies follow, a train of retrograde disintegration phenomena is exhibited in the structures of the viscera and those which support them. Rhythmic action, a cardinal function of the hollow viscera, becomes impaired, along with loss of peristalsis, dilation, and the whole range of the visceral ptoses. Here dietetic regulation needs to be supplemented by manual treatment and other forms of vasomotor stimulation. Vasco-constrictor derangement conditions most diseases, all soon or late, and when established there follow passive congestions, infiltrations of parenchymata of organs and their supporting structures, relaxation, dilatation, ptoses, functional alteration, and disintegration. The cell-bodies in the segmental centres controlling the viscero-motor activities thereby become starved, and upon their repair depends restoration of function.

A prompt and efficacious means of achieving this is by employing gentle alternating pressure on the tissues of the back adjacent to the spine, along with regulation of diet and possibly some drugs enhancing adrenal action.

A most material point in dietetics is to secure full mastication and insalivation, though this is too often overlooked. Children, many of them, bolt their food; nurses and parents are often careless or hurried, and regard their duty done in supplying enough, often too rapidly and too much. This fault causes almost as many digestive troubles as unsuitable food.*

A practical part of all hygiene or rational regulation is exactitude and minutia in all the acts, duties, and pleasures of the day. These directions should be on broad lines, dominantly sketched. For a sick child we must have always plenty of fresh air, cool, but if too cold it tends to weaken the already impaired resistance in the lungs.

The true purpose of the therapeutist is not only to restore the balance of health in the individual, but to reach much farther and aim at perfection. His resources are, first and last, dependent upon the intrinsic resources of the organism; his prerogative is not, or should not be, limited to restoration, but includes always efforts at development and amplification of the auto-protective forces. This can be carried so far that hereditary and inherited faults can often be eliminated in two or three generations. These auto-protective forces, inherent powers for regulation, adjustment, and maintenance of vital actions, should be studied from various aspects and our remedies always directed to repair of the fundamental mechanisms.

At the head of all forms of therapy stands preventive treatment. By this is not meant Board of Health measures. It would be absurd to include the negative as a part of a positive proposition except for the fact that prevention is largely partial and relative, hence must be reckoned as an integral part of systematic therapy. The largest concrete results within the possibilities of medical art lie in the early recognition of abnormal conditions and nullifying these wholly or in part. We all have a more or less definite notion of the scope of preventive measures and hygiene, especially as applied to tuberculosis, rickets, scurvy, lymphatism, etc. In respect to scoliosis, for instance, as Percacini has pointed out (*Gaz. Ospedali Cliniche*, Feb. 11, 1906)

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*The scientific principles which underlie the milk feeding of infants have received much clarification of late at the hands of Dr. Godfrey A. Pisek, *New York Med. Rec.*, Sept. 9, 1905; Thos. S. Southworth, *New York Med. Rec.*, Jan. 13, 1906; L. E. Holt, *Pennsylvania Med. Journal*, April, 1906, etc.

this is a most preventable state, yet little correction is attempted in its incipience. Many derangements and diseases of adults exhabit their beginnings in childhood—*e. g.*, convulsions; hence arise epilepsies, palsies, contractures, deformities, etc.; bronchial attacks and their recurrences, foreshadowing asthma; likewise the milder neuroses and psychoses lead to endless puzzling disorders, so also many derangements of unstable cellular adjustments of childhood. All this, as I have repeatedly pointed out, is entirely within the province of the watchful physician. The real difficulty is less his omission of accurate observation and corrective measures than of failure to secure the co-operation of the family. To know, one must have opportunity to observe. The duty of parents is to invite the attention of the physician to trivial seeming disorders. To do this is the clearest economy of money, suffering and future disabilities.

Among the measures recognized as forcible in limiting the spread of communicable diseases is the biologic principle of acquired immunity. We cannot make much practical use of this, but it is a great comfort to know that, since such diseases must prevail until they are stamped out, there are some mitigating circumstances connected with their prevalence.

Evidence exists to show that the processes of disease are accompanied by a conservative action tending toward repair—a reinforcement of the autoprotective mechanisms. E. W. Watson has enunciated the proposition (*Monthly Cyclopedia,* March, 1906), that by repeated exposures to infection there comes an acquired immunity which in the aggregate and under a certain large proportion of circumstances and in the long run results beneficently. He says: "There is also the way called 'the survival of the fittest,' and for it we substitute the survival of the unfit. There is also the way we might call immunity through exposure and we substitute for it immunity by seclusion, quarantine, and segregation; but for immunity through exposure there is still something to be said.

"Immunity by exposure is based on a great underlying law which extends to things moral as well as things microbic—to the action of the elements that war against us as well as to the bacteria that so silently bear death influences. Do we shun cold and fear draughts and exposure? How are we best inured but by the repeated short shocks of cold bathing that rouse up resistance?

"So, while no one could urge an entire abandonment of modern methods, it is perhaps as well, once in a while, to pause and try to realize that, apart from them, there is ever working a force that makes for health and, though slow, can through hard-fought battles and many slain, bring us victory."

Sir Frederick Treves (address Edinburgh Philosophical Institute, 1905), asserts his conviction, under the title "The Beneficence of Disease," that the end results of disease constitute a protective influence in pathologic processes, declaring "if it were not for disease the whole human race would soon become extinct."

In an editorial in *American Medicine,* Dec. 30, 1905, comments are made on the decreasing virulence of infectious diseases, showing that there is some evidence to prove that these may eventually become harmless through the cure and survival of immune hosts. As old diseases become modified, possibly new ones may arise.

G. Archdall Reid years ago called attention to this process in "The Present Evolution of Man." Thebald Smith (*American Medicine,* Oct. 22, 1904), showed that a biologic adjustment has probably been caused in some instances by the survival of only those bacteria which are able to live in the host without the production of free toxins. Some of these remain confined to the surface of skin or mucous membranes, and only occasionally induce generalized disease, merely local disturbances.

These and similar opinions, emanating from careful thinkers, are glimmerings of elemental truths which we may hope ultimately to understand and apply. To achieve this end we must employ increasingly philosophic methods fortified by comprehensive view-points, attainable only by the formulation of essential principles, and adapting them to our clinical use. Nevertheless while contemplating these significant generalizations, our duty is to limit to the uttermost the spread of transmissible diseases. This is possible in proportion as (1) the general practitioner is vigilant and dominant, (2) the co-operation of the family and (3) the co-operation of the municipality is secured. Medical inspection of schools is accomplishing a silent but tremendous victory. This care is the more needed in view of the disastrous secondary effects of infections, and nothing can condone omission of all reasonable precaution in isolation of those sick of transmissible disease.

Serum-therapy is still in a position of experimentation. In the treatment of diphtheria the use of anti-toxin has become established as a pronounced success. In respect to other diseases there is only moderate encouragement (E. W. Goodall, *Brit. Med. Journ*, Oct. 8, 1904); with respect to plague, typhoid fever, dysentery, and streptococcal infections, there is sufficient evidence of benefit noted to stimulate further endeavor. Something is probably lacking in the form of the anti-toxin which may be yet supplied and justify a wider use and confidence. The intravenous administration is found in some instances to be more efficacious (C. J. Martin, Director Lister Institute); it saves time—eight hours (Behring).

These conclusions were also reached from a careful analysis of all the recorded facts by Sajous in his book (*op. cit.*) published 1903.

The laws of growth as formulated by Theo. von Escherich are: (1) The smaller or younger the organism, the greater the intensity of the metabolic processes calculated for the body measurements. This continually diminishes throughout the entire course of life. (2) The functional development of each individual organ, measured by the absolute degree of ability for work, takes during childhood a rising course, different for each organ. (3) The growth of individual organs occurs, not simultaneously, but with varying intensity by leaps. The order is influenced by the greater or less importance of the developing organs for the preservation or protection of infantile life.

As a most valuable auxiliary measure, capable of modifying many acute conditions to a marked and emphatic degree, and protracted diseases even more so, let me mention manual treatment directed to the regulation of the vasomotor action. In a former paper (*British Journal of Children's Diseases,* January, 1905) I have given an outline of the part which the vasomotor nerves play in regulation of the viscera, etc., and how these may be controlled by alternating or continued pressure, inducing reflex constriction or dilation in the blood-vessels supplying the viscera, exerted on the erector spinæ muscles which are supplied by the posterior primary divisions of the spinal cord. The subject has been fully systematized by John P. Arnold (*New York Med. News,* March 18, 1905). A long and careful series of clinical observations have convinced me that this apparently simple auxiliary measure, used with a fair working knowledge of the distribution of the vasomotor mechanisms, is forceful in accomplishing results which are beyond the reach of drugs and various rational so-called "physiologic" therapeutics. In this way I am able to get results far beyond my earlier expectations, and as I acquire skill and experience confidence is increased in my ability to modify most acute conditions, and particularly to hasten resolution, repair, functional balance in subacute and chronic states.

The time occupied by this manipulation of the tissues of the back is seldom more than a few minutes, and in acute conditions gentle continued pressure should be exerted once or twice daily, in others alternating pressures a little longer and more generally applied, and from three to four times a week will suffice. As an example of what can be thus accomplished I make the assertion with confidence that I have apparently cured over a dozen cases of bronchial asthma in children who had suffered since babyhood or early childhood. Many persistent digestive, pulmonary, and blood derangements have yielded surprisingly to the measure in my hands when all the ordinary methods had accomplished little or nothing.

CASES OF INFANTILE SCURVY.[1]

By H. Swift, M.D.

Mrs. G's baby, aged 13 months. Never had the breast, as the mother never had a natural flow. The child was fed on condensed milk for two or three weeks and was then put on a patent food until it was six montths old, when another was substituted for it. For some weeks prior to bringing the child to see me the mother thought the child was not thriving and growing as it should do, and for the last two weeks it had been very fretful and peevish, and cried when it was moved very much. The day or two prior to her visit the child screamed whenever it was raised or washed. The mother thought it cried more if its right side was moved.

I saw the child on August 1st, 1903, in my rooms. It was a pale child, rather old looking for its age, but small and backward; no evidence of any teeth, gums normal otherwise; very fretful, screaming whenever I touched it anywhere, so that it was not easy to make out if there were any local lesion. At last I was convinced there was considerable—compared with the opposite limb—enlargement of the lower third of the right femur, and upon manipulation the child flinched more than when the other parts were touched. The temperature was normal; there was no heat nor redness, no sensation of fluctuation, no crepitation, no effusion into the joint, no bruising, no history of any injury, but for lack of further evidence I thought the swelling must be due to an injury.

I saw the child at home for the next 14 days, but although absolute rest had been enforced there was no improvement; in fact, the swelling was more marked, and extended from about the centre of the femur to just above the knee. On August 14th Dr. Marten saw the child with me, but owing to lack of any other symptoms we were unable to arrive at any definite diagnosis. The child remained in much the same condition, fairly comfortable when allowed to remain at rest, screaming violently if moved, until August 27th, when I suggested that Dr. Verco should see the case with me. The parents thought they would wait a day or two longer. On the 29th the child had cut a tooth, and the gum all round was very red and spongy, much more than it is ordinarily when a tooth protrudes; the leg was in the same condition. I at once put the child on fresh meat juice and a potato a day, with fresh cow's milk. I asked again that Dr. Verco should see the child. On August 31st Dr. Verco met me and agreed that the case was one of infantile scurvy. The improvement in the condition after the alteration of diet was simply marvelous. The child was practically well in a fortnight.

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[1] Australasian Medical Gazette.

The diagnosis in this case was most difficult, and it was not due to the fact that I had overlooked the possibility of the case being infantile scurvy, for this disease was one of the first that occurred to me, especially as the child had never been nursed; but the conditions were so unlike any other case of that kind that I had seen that I put it on one side until, with the eruption of the first tooth, a month after I had first seen the child, the pathognomonic ruddy gum cleared up the diagnosis. Apparently only one long bone was affected, and that not one of the commonest; the tibiæ, which are most frequently subjected to the hemorrhagic extravasations escaped. There were no subcutaneous hemorrhages, either deep or superficial; there were no teeth in the gums; so that perhaps there may be some measure of latitude extended to me in my hesitation to arrive at a definite conclusion.

On October 20th, 1904, Mrs. M. brought her baby, *aet.* 10 months, to see me. She gave me the following history:—She had never been able to nurse the child; she had given it condensed milk up to three months; then it had Allen and Hanbury's Foods, Nos. 1, 2 and 3. When it was seven months old it began to cry whenever it was moved, and appeared to be sore all over. It had awful attacks of screaming, as though in much pain. Shortly after this its mother noticed its legs and ankles were swollen, especially the right. It sweated a great deal. It had been treated by a doctor for rheumatism for 11 weeks, but was gradually getting worse.

The child was a pallid, flabbily-fat child. It screamed the whole time it was being undressed for me to examine it and, in fact, until it left my consulting room. The child lay in its mother's lap with its legs slightly flexed, but made no effort to move them voluntarily, and screamed more violently when I attempted to do so. Both legs, ankles and feet were swollen; there was no redness, no increase of temperature; the swelling on the dorsum of the foot pitted on pressure, but did not do so over the tibia. The right leg was much more severely affected than the left; there was apparently a uniform enlargement of the whole of the shaft of the tibia; no bogginess nor fluctuation could be detected. There was some enlargement of the lower epiphyses of the radii, and some slight beading of the ribs. There were no teeth protruding; the gums were not abnormal; there were no subcutaneous hemorrhages; no history of any bleeding from any cavity. From the mother's statement and from the appearance of the swelling, and from the condition of the child generally, I felt confident of my diagnosis, and to prophesy that the child would very rapidly recover upon an alteration being made in its diet. I put it on fresh unboiled cow's milk and barley water, potatoes and fresh meat juice.

October 27.—The mother came in delighted as the child had given up screaming and was very much better in every respect.

The swelling from the dorsum of the foot had gone, and that around the tibiæ was rapidly disappearing. On November 27th the baby was comparatively well, and appeared bright and lively. The swelling had practically been absorbed.

These two cases, with one case that I had under me in December, 1901, and another in March, 1903, are the whole number of typical instances of infantile scurvy that I have seen in this country.

Considering what a large proportion of the population are reared in every way except *au naturel,* it is a remarkable thing that these cases are so few and far between. I don't fancy I have overlooked the condition, for having seen several of these children under Sir Thomas Barlow and Dr. Cheadle I was very much impressed with the interesting features of the disease and the wonderfully rapid recovery under an anti-scorbutic diet. On a previous occasion I have drawn attention to the comparative rarity of rickets in this state; infantile scurvy is still more rare. Although, as I have said, a great number of children are brought up on condensed milk or patent foods, I am inclined to think that the reason the disease is not more common may be attributed to the fact that the food of the infant is not limited entirely to these foods and that it has a considerable quantity of "pieces" given to it as well. In a letter I received from Sir Thomas Barlow last August he remarks: "The defect of fresh living aliment is the *vera causa*. A certain patent food has now the premier place amongst the foods, and most of the cases I see of infantile scurvy are from that food, but I imagine that it is because it is the one most commonly used. Keep your eye on children brought up on pasteurized and doubly sterilized milk. I have had some notable cases on sterilized milk."

Infantile scurvy is only one of the many troubles produced by unsuitable food, and one of my principle reasons for bringing these cases under your notice is that I may take the opportunity of entering an emphatic protest against the fashion of rushing to use one of the ever-increasing army of patent infant's foods. If for any cause it is found necessary to have recource to an artificial source for the rearing of a baby, it appears to be a canon to try everything before the child is permitted to have a food which is as nearly as possible the counterpart of the nutriment it would have had if fed in the way nature usually provides. It seems to be the same old something mysterious that fascinates that public which loves a quack remedy, the ingredients of which are supposed to be known to the proprietor only, whereas in reality nearly all the popular quack remedies are compounded of well-known drugs from some medical man's prescription. The vast majority of these proprietary foods are *per se* quite unsuitable for food for young infants owing to the large quantity of starch they contain, and also to the lack of anti-scorbutic properties, but when added to fresh cow's milk one or two of them are of very distinct advantage for a time.

Of these infant's foods we find three chief classes:—1. Those which are prepared from cow's milk with certain variations, and which require the addition of water only to be ready for use. 2. Farinaceous foods, in which the starch has been partially or wholly transformed into dextrine and which require the addition of milk to fit them for use. 3. Farinaceous Foods.

With regards to Class 1, the chief objection to their use is that none of them possess anti-scorbutic properties and are faulty in lacking in fat.

In regard to Class 2, when compared with dried human milk they are all deficient in fat, mineral matter and proteid. If mixed with water only they could not be true substitutes for human milk. The disadvantage of the majority in this class is that the conversion of the starch takes place during the preparation, and is too much at the mercy of the skill and care of the mixer; and even when the directions are carefully followed the result is by no means satisfactory.

The third class contains too much free starch for the use of very young children, and should be avoided until the child has cut several teeth.

The best of these foods then are Horlick's from the first group and Mellin's food from the second, but the first named can only be used for a time to tide over a gastro-intestinal crisis or inability to take other forms of food. Mellin's food, on the other hand, owing to the fact that it is made with fresh cow's milk, can be used with advantage, and makes, generally speaking, an excellent food, if the milk supply can be relied upon; that is the whole crux of the artificial feeding of infants—the milk supply. If the milk could be supplied pure, *i. e.,* free from bacteria, perhaps we should not hear so much of patent infant foods. From what I have written I do not wish to convey the impression that I absolutely condemn all patent foods, or all except one or two. There are times when in cases of severe illness we can employ one of the patent foods, especially one of the partially digested foods, with distinct advantage for a time; but what I wish to assert is the fact that these foods should not be relied upon solely to rear a healthy child, and that if a pure supply of cow's milk can be secured, it is very much to the advantage of the child that this "live food" properly diluted and enriched, should be given it instead of one of the dried foods, and it is certainly very much to the advantage of the parent, as most of these foods are very expensive.

The milk supply must be *sans reproche*. A vast amount of attention has been paid to this matter in the past year or two in all parts of the world and numerous experiments of one kind and another have been tried. In America especially, an almost ideal system appears to be in vogue in one or two centres of population. In this state a few years ago efforts were made to start a milk supply company that promised to be of immeasurable benefit to the public, but unfortunately difficulties arose and the matter was dropped. Great credit is due to our health authorities for the improvement in the condition of the dairies by the enforcement of the regulations of the Health Act of 1898, but much more is required to be done, as anyone may observe for himself if he inspects some of the dairies in the neighborhood of the city.

That the Health Boards are alive to the fact is proved by the issuing of circulars and appointment of inspectors.

The ideal system referred to before consists in first, healthy cows, well fed and kept; second, buildings arranged on scientific and perfect sanitary conditions; third, attendants who understand and are impressed with the importance of attention to detail; fourth, the washing of the teats and udder of the cows with some antiseptic solution; fifth, the milking with machines and the milk to be run direct into bottles which had been perfectly prepared; sixth, the cooling of the milk by means of ice or cold storage; seventh, delivery to the public as soon as possible; eighth, in a certain proportion the preparation of milk intended for the very young infants; ninth, the dairies should be inspected periodically not only by inspectors, but also by medical men.

I do not wish to quote a lot of statistics to you, these are continually being published, but would only quote from the Registrar-General's report for 1904, the facts that there were 637 deaths of infants under one year of age, which were in the proportion of 7 to 100 births. This is the lowest proportion this State has known, and is lower than in any of the other States. Of these 637 deaths, 178 are attributed to diseases of the alimentary canal, and 138 are said to have died of debility, atrophy or inanition; these do not include 93 deaths from premature birth and 21 from developmental diseases. So that really one-half of the deaths of children under one year of age ($178+138=316$) can be put down to disturbances in the alimentary canal and faulty assimilation therefrom; and the great probability is that a very large proportion of these deaths could have been prevented had the mothers been able to obtain milk free from bacteria, and had the mothers been educated how to attempt to rear their children on scientific principles.

A CASE OF INFANTILE SCURVY[1].

By George Dock, M.D.

Infantile scurvy is a comparatively rare disease everywhere, though becoming more frequent. Chiefly because of its infrequency it is often unrecognized, and so reports of single cases, even if they add nothing to the real knowledge of the subject, may be useful by calling attention to the existence of the disease when it might otherwise be overlooked. For this reason I report the first case that has been treated in the university hospital.

Summary.—Case of infantile scurvy treated for two months with diagnosis of neuritis and probable anterior poliomyelitis, with sore mouth. Easily recognized as infantile scurvy by ocular proptosis with subcutaneous hemorrhages of the eyelids, characteristic swelling and discoloration of gums, depression of anterior thoracic wall, swelling and tenderness of wrists and ankles: slight rickets, sweating of head; rapid recovery on change of food and use of orange juice.

Patient.—E. B., aged 10 months, admitted to university hospital Oct. 23, 1905. The mother, aged 24, was very small as a baby, but has always been well since then. She looks well and is of robust frame. The father, a well-to-do farmer, is 26 years old and in good health. The patient, their first child, was born Dec. 26, 1904. The birth was not difficult.

History.—The mother tried to nurse the baby, but after three weeks was obliged to stop. Milk and water, equal parts, sterilized by boiling for one hour, was next used. Barley gruel and milk sugar were added to the milk from the third week. The child vomited curds and was tympanitic, so a change was made, at 5 weeks, to the following preparation: Milk, 10 tablespoonfuls; water, 24 tablespoonfuls; Mellin's food, 4 teaspoonfuls.

As this was not taken well, the Mellin's food was increased and the water lessened, and up to the time the patient came to the hospital she took the following: Milk, 25 tablespoonfuls, water, 7 tablespoonfuls; Mellin's food, 9 tablespoonfuls. The mixture was heated to 165 F. for about ten minutes. The quantity taken at each feeding was rarely more than 3 ounces, and for some time five feedings were given in twenty-four hours.

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[1] Jour. A. M. A

The weight at birth was 8½ pounds; at 5 months it was 14 pounds; at 8 months 15½.

Constipation has been the rule, rarely interrupted for a day at a time with as many as three to six stools in a day. In the end of August there was bright red blood in the stools and then for from two to three weeks the stools were almost black, becoming natural only about October 10.

The lower central incisors were cut at six months, without special difficulty. At the end of August the upper central incisors began to appear. At that time it was observed that the baby screamed when her feet were touched. Soon she ceased to use her legs, but there were variations in the degree of this. Then the back became sensitive to touch and she stopped sitting up in the middle of September. Then the arms became quiet, the left almost entirely so. The right arm was only moved to put the thumb in the mouth, where it was kept most of the time. As the upper teeth were slow in coming through, the gums were incised. About the last of August the upper gum became swollen, appearing like a blood blister which subsided slightly at times, though the main swelling never disappeared nor became much smaller. The lower gum became swollen after the upper one.

About October 15 the right upper eyelid swelled suddenly. Eye salve was applied. The swelling subsided, but left a bluish red discoloration. The left upper eyelid became swollen October 23, and when admitted the lid was swollen so it did not open, was deep pink and edematous looking. The head has perspired profusely for a long time. There has never been any sign of laryngismus stridulus.

Status Prasens.—October 24: The baby lies with its right index finger in its mouth. Occasionally cries, but cries at once on being disturbed. Is of fair size; weighs 15 pounds. The head is square; anterior fontanelle 38×34 mm.; soft blowing systolic murmur over it. The scalp is sweating slightly.

The right eye is prominent. The upper lid is slightly swollen and shows a pale blue oval discoloration at the upper margin. The left upper eyelid, which was closed yesterday and bright red, is less swollen; pale red; the skin finely wrinkled. The lids open one-eighth inch. The bulbs move naturally; both are very prominent and seem to look down. The conjunctiva is normal.

The rest of the face is slightly puffy, the cheeks flushed, ears pale. There is a scanty eruption of minute red papules in the scalp and on the abdomen, but no petechiæ.

The lower central incisors are about half way through. The gum around them is slightly swollen, reddish purple, the purple most marked close to the teeth. The upper incisors can not be seen. The gum over them is swollen, forming two oblong oval elevations, the right 1 cm., the left 1.5 cm. long. These are dirty red at the bases, blue at the tops, but the extreme tops are broken and appear as ragged dirty-looking ulcers covered with small granulations. The mucosa of the rest of the mouth and pharynx is healthy looking; the tongue is not swollen; has a very thin white coat.

The thorax is of good size. The sternum and costal cartilages are flat and look as if pushed in, forming a ridge running from the nipples to the flanks, parallel to the margin of the ribs, from which the ridge is separated by a shallow groove. The chondrocostal articulations are firm; very slightly swollen. Heart and lungs negative.

The abdomen is below the level of the ribs. Liver and spleen not enlarged. The back is tender, but otherwise negative.

The left arm lies extended; the right thumb is in the mouth and can be moved away without evidences of great tenderness. The wrists and lower fourths of the forearms are swollen; the skin is not tense, but there is a firm swelling seemingly beneath the deep fascia. The hands are emaciated. The thighs and knees are negative. The upper parts of the tibias are not distinctly thickened. The lower thirds of the legs and the ankles are swollen, the skin glossy, and at the same time pitted, like an orange peel, with slight bluish yellow discoloration. The swelling is very firm. Touching the arms and legs causes severe crying, with many tears. The legs and feet are kept extended; no effort is made to move them.

Blood: Reds, 4,000,000; leucocytes, 11,700; hgn., 80 per cent. Differential count (Dr. H. A. Freund): Small lymphocytes, 14.2 per cent.; large lymphocytes, 9 per cent.; polymorphous, 75.2 per cent.; transitional, 0.8 per cent.; eosinophile, 0.4 per cent.; basophile, 0.4 per cent. Few microcytes; many macrocytes; few poikilocytes.

Treatment and Course.—Orange juice was begun as soon as the baby was admitted. It took one ounce of a 25 per cent. mixture very well, apparently liking it, before each feeding. It also took the following milk mixture: Cream, 8 fluid ounces; milk, 1½ fluid ounces; lime water, 1 fluid ounce; water, 9½ fluid ounces milk sugar, 6¾ drams. Heated at 99.5 C. for twenty minutes; then cooled; 5 ounces every three hours.

October 25: The baby is distinctly better. It looks more intelligent and does not cry as much as before. The swelling is entirely gone from the left eye. The blue spot on the right lid is more distinct. The gums are less swollen and less blue. The wrists are smaller; ankles about as before. The milk was increased to 2 ounces. Mutton broth cooked with potato and carrots was given.

October 26: The appearance is still better. Moves hands and does not complain as much when touched. Ankles very little smaller than before. Food changed to: Cream, 8; milk, 4; otherwise as before.

October 28: Looks much better. Moves left hand freely, also feet. Wrists and ankles are smaller, but the left internal malleolus is still surrounded by considerable swelling. Milk changed to 5 ounces; other ingredients as before.

October 30: General appearance better. Moves all extremities actively. Gums less swollen; lateral upper incisors show through. Eyes, ankles and thorax about the same. While in the hospital the bowels were slightly constipated. The stools were of natural color and well digested. There was a positive test for occult blood (Dr. Cowie) on October 25, 26 and 27; negative afterward. The urine was not obtained, but the napkins showed no traces of blood. The temperature ranged between 101 C. on admisson, and 98.6 C., usually between 99 C. and 100 C. Weight 15½ pounds.

Patient was discharged, with full directions for raw milk, milked with as much cleanliness as possible; aërated at once, filtered through cotton and kept on ice.

November 1: Returned for examination. Looks stronger. Moves more than ever before. Does not cry when handled. Discoloration on right eyelid clearing up. Eyes are further back than before. Upper gum is still spongy and red, but improving. Ankles and wrists about as before.

November 7: Patient sat up yesterday alone. Better in every way.

November 10: Examined in clinic. Moves extremities freely and sat up alone to-day. Color good. Discoloration of right eyelid has disappeared. Left eye normal. The eyes are not prominent. The thorax is deeper. The gums are still slightly swollen and red. Does not take orange juice as well as at first. Is taking 6 fluid ounces of milk in 20 ounces of the mixture. Weighs 16½ pounds. Food changed to cream 8 and milk 7 fluid ounces; other ingredients as before. Broths and gruels were also prescribed.

November 23: For two or three days has not taken food as well as before. Vomited once on the 19th, probably as the result of cathartic medicine. Looks stronger. Moves actively. Wrists are thick; ankles smaller than before. No discoloration. No tenderness. Gums natural; four upper incisors out; three below and fourth almost through. Costal cartilages still show groove, but body is more rounded than before. Advised five meals a day.

REMARKS.

Diagnosis.—Among the points of interest in the case, diagnosis takes the first place. Like many similar cases, the true nature of this one was long overlooked. During this time the patient was in the care of two physicians, in turn, of considerable experience and more than average ability. Neither had ever seen scurvy at any age, and they had only the usual knowledge of the less common diseases of childhood. But lack of actual observation of a similar case can not be a valid excuse in practical diagnosis. All progress in medicine would stop if it were. The physician first consulted discussed the case with a surgeon, who suggested neuritis without seeing the patient. The other suspected anterior poliomyelitis, but not feeling certain, referred the patient to me. The chief cause of failure was the lack of a thorough examination, the cause of most faulty diagnoses. This was assisted by a failure to compare the findings with descriptions in text-books on diagnosis and practice.

A literary knowledge of the subject does not alone prevent error. Heubner tells us that in half the undiagnosed cases of infantile scurvy he saw in consultation the physicians in charge had a literary knowledge of the disease. Until I stripped the baby and examined its extremities, its mother and a very experienced and critical grandmother were not aware of the striking alteration in the shape of the thorax and the swellings and discolorations of the extremities. Had an examination been made, the first diagnosis of neuritis must have been given up on account of the absence of objective evidences of that disease and the presence of other features that could not be explained by neuritis alone. Then it would have been necessary to consider the possibilities that have caused error in other cases. Osteomyelitis, so often diagnosed, even to the point of causing operation, could hardly have been suspected in this case. In some, where the swelling has been greater and less symmetrical, only a complete examination and thoughtful differential diagnosis could prevent error. Against rheumatism, the relative constancy of the local lesions, the fact that they were not in the joints, the absence of superficial redness and of distinct fever would have been useful. On the other hand, the sweating of the head, if not considered in all its bearings, and the slight elevation of temperature, might easily confuse the diagnosis in this respect. Against sarcoma, the multiplicity and symmetry of the lesions, and the failure rapidly to increase should suffice. Against syphilis with pseudo-paralysis the condition of the parents, the age of the patient, the condition of the skin and mucous membranes, the absence of joint involvement and the great degree of tenderness, would be decisive. Anterior poliomyelitis was an insufficient diagnosis in view of the physical conditions. There was also no history of the onset of that disease, and the description of the course of the pseudo-paralysis was clear and agreed more with that of scurvy than of infantile paralysis. Rickets would have been a better diagnosis, would have been partially correct, and, if made in time, should have led to a change in diet that would, in all probability, have prevented the full development of infantile scurvy. The case illustrates the importance in all cases of artificially fed infants of looking for rickets and the scurvy so often associated with it.

Critical examination of the mouth should have made it clear that the disease in the gums was not due to the incision, as was supposed, for it was also present in the lower gum that had not been incised. Further study of such anomalies must have led to a correct diagnosis of scurvy.

The proptosis and subcutaneous hemorrhage in the eyelids came on late. Diagnosis made in time should have prevented them. Although the orbital changes are relatively rare, the fact that E. Schlesinger has recently reported a case in which orbital hematoma was the first symptom in a case of infantile scurvy shows the importance of a general knowledge of the process. The article of Schlesinger[1] and that of Irving Snow[2] give a complete résumé of our knowledge of this interesting symptom. In regard to its incidence, the collective investigation of the American Pediatric Society gave only 22 cases out of 379, positively absent in 110. Heubner saw 4 cases out of 65. Barlow, who first described it, has also seen a case in which orbital hematoma was the only symptom. Snow shows the anatomic feature of the condition, a subperiosteal hemorrhage like the process on other bones, and Cohn's report of a case in which the hemorrhage came on suddenly, during a severe crying spell, suggests a traumatic element that is often present in the hemorrhages on the long bones. The successive affection of the two orbits, as in my case, is very frequent.

Etiology and Results of Treatment.—The study of the casual factors in the case reveals nothing new. There is the history, as in most cases, of a monotonous food, composed of a milk mixture that would not seem well adapted to the patient, and yet it seemed to agree fairly well for a longer time than one would have anticipated. The long-continued use of Mellin's food is of interest, but does not give any positive ground for conclusions. It is interesting to observe that severe gastrointestinal disturbance did not occur. The idea that a severe diarrhea or enteritis had been present was entertained by one of the physicians, but was not borne out by the clear and positive descriptions of the relatives nor by the examination of the stools. The bloody stools were certainly the result of the scurvy, without further implication of the intestines.

As in so many cases, we can not say whether the cause here was some qualitative or quantitative alteration of the food elements or some toxic substance, or all combined, in a patient long inappropriately fed.

Some other details of the feeding are interesting. The patient lived on a dairy farm, the herd being made up of Jerseys with a few Holsteins. As I learned later, the milk had undergone official tests and was good in every respect. When I began the treatment I was afraid to use raw milk, fearing the supply on the one hand, the gastrointestinal condition of the patient on the other. I therefore gave orders to Pasteurize the milk at 160 F., but by an error the method then in use in the ward was followed, and the milk was really heated longer than before and at a higher temperature. The only differences, then, were in the different source of the milk, an element that can not be analyzed, the withdrawal of the Mellin's food and the use of orange juice. Before anything else was given a distinct improvement was obvious, and recovery occured while on sterilized milk, orange juice, and a small amount of potato and carrot broth. So rapid an improvement, of course, is not at all uncommon, and the change as soon as the orange juice is given, along with the curious avidity with which my patient took it, like so many others, seems to prove that it contains something much needed by the scorbutic body.

Skiagraphy.—My efforts to get an X-ray picture of the affected bones were not successful. It was impossible to make an exposure the first day, when the legs were spontaneously kept still. By the next day there was some motion when the noise and light of the apparatus were perceived, so that it was not possible to make a slow exposure with a soft tube that would show fine differentiation of the soft parts. The pictures, of which my colleague, Mr. V. H. Willey, made a number, show the swellings, as well as the appearances of the bones, but nothing more.

X-ray pictures of infantile scurvy have been published by Ausset, Rotch[3] and Lenndorff.[4] Those of Ausset and Rotch are not very good. Lenndorff's is given in a rather diagrammatic reproduction. The author says there were shadows along the femur and the tibia and fibula, and a clearing up of the bone shadow in all the bones. He explains the findings by assuming that the periosteum had had time to exert its osteogenetic function, a belief that is borne out by postmortem examinations. Lenndorff, however, very properly warns against too much dependence on the skiagraphic diagnosis of infantile scurvy, though it may be of assistance in clearing up some of the anatomic changes.

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[1] "Zur Symptomatologie der Barlowschen Krankheit." Muench. med. Wochft., Oct. 24, 1905, p. 2073.

[2] "Eye Symptoms of Infantile Scurvy," Archives of Pediatrics, August, 1905, p. 576.

[3] Medical News, 1903, vol. ii.

[4] Archiv. f. Kinderheilkunde, vol. xxxviii, 1904, p. 160.

SOME VARIETIES OF HERNIA IN CHILDREN[1].

BY E. SCOTT CARMICHAEL, M.B., F.R.C.S.E.

An experience gained by operation on 152 consecutive cases for radical cure of hernia in hospital and private practice has afforded me an opportunity of inquiring into the numerous variations and complications associated with herniæ in young children. Operative treatment of hernia at an early age is now becoming recognized as the more suitable form of treatment in most cases, and to those surgeons who have had much experience in the radical operation it has become the most satisfactory method of treatment. As a result of studying the anatomical variations which are found during operation, one cannot but consider that many of the ordinary textbook descriptions of the last few years are apt in some cases to be misleading.

For convenience of description the results obtained in the following cases have been arranged according to the age and sex of the children operated upon.

In males 44 were under 1 year of age.
67 were between 1 and 5 years.
22 were over 5 years of age.

In female children 19 radical cures were performed for inguinal hernia.

AGE OF OPERATION.

The radical cure was only performed on two occasions on children under 3 months. The two exceptions were both cases of strangulated hernia in infants aged 2 weeks and 3 weeks respectively. In children who are brought to the out-patient department within a week or two of birth, it has been customary to delay operation until the fourth, sixth or eighth month, for two reasons: First, to enable the child to get a start in its feeding, especially if breast-fed, before admitting it to hospital and weaning it; and secondly, because in 75 per cent. of cases it is found to be advisable to circumcise it, in order to facilitate the after-treatment, while the skin of the infant after four months becomes harder and less liable to excoriation or intertrigo.

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[1] Brit. Med. Jour.

The age of choice, therefore, if the child is found at birth to be the subject of hernia, and is at the same time healthy, may be set down at from 4 to 8 months, before the appearance of the first dentition. If the child is cutting teeth rapidly, and therefore liable to attacks of gastro-intestinal catarrh, it is wiser to defer operation to a later period, but this rule, except in certain instances, may generally be infringed without harm in most healthy children.

The age at which most children are brought to hospital is generally after the first year, so that operations for radical cure are most frequently performed between the ages of 1 and 5 years. After this the frequency with which the operation is performed gradually diminishes up to the age limit—namely 12 years—of admission to the hospital.

In the cases under consideration in males:

33 per cent. were operated on under 1 year.
50 per cent. were operated on between 1 and 5 years.
17 per cent. were operated on over 5 years.

MORTALITY AND RISKS.

A not infrequent complication, and sometimes a dangerous one, is diarrhea, which occasionally may be somewhat intractable, and in two cases, both under the age of 1 year, the child's condition was a serious one for two or three days. This complication is, however, rarely of importance in children after 1 year. Sickness and vomiting after hernial operations are slight, and do not persist for any length of time.

One death must be recorded in the present series. It was that of a weakly child, aged 3 weeks, admitted with a strangulated hernia of the right side, associated with excoriation of the buttocks and groins, the skin up to the seat of incision being in a raw and unhealthy conditon. The wound became septic, the child dying two days afterwards.

Since this case, which was the fourth of the series, no fatal issue has taken place, giving a mortality for all operations, including strangulations, of 0.6 per cent.

VARIETIES OF HERNIA.

The classification of hernia, as adopted in most textbook descriptions, into acquired and congenital (the latter, according to some authorities, including the so-called "infantile" form), from the size and extent of the sac, has tended, perhaps, to place a large number of what are true congenital herniæ among the acquired forms. One cannot but think, after operating on these cases, that congenital hernia forms a very much higher percentage of all herniæ than many authorities would lead one to suppose.

Macready states that only 8 per cent. of all herniæ are congenital, while Treves states that "congenital hernia is not very common."

Of the 44 cases operated upon under the age of 1 year, the majority were seen within the first 2 months after birth, and one must consider that probably most of these were true congenital hernial sacs, or exhibited a marked congenital predisposition to the formation of hernia. The type of sac in 39 of these cases was funicular, while in the remaining 5 it communicated with the tunica vaginalis testis. It is interesting to note here that 3 of the cases with complete vaginal sacs were operated upon on the same day, the other two occurring at an interval of eighteen months.

A complete vaginal sac was present in 7 cases out of the 133 radical cures performed. Whether all these herniæ are to be considered congenital in origin or not, it is probable that the commonest form of sac in congenital herniæ is the funicular sac.

Walsham describes congenital hernia as "a hernia into a patent funicular process which has remained open, and forms a sac with the tunica vaginalis testis," and does not refer to the possibility of a congenital funicular sac.

From the present series of cases one must rather agree with the view of Hamilton Russell that the persisting upper end of the funicular process, though not communicating with the tunica vaginalis testis, does constitute a congenital form, and that the funicular sac is the most common anatomical condition found in over 75 per cent. of cases of congenital herniæ.

As to the so-called "infantile hernia" much stress has been laid on the varieties of this condition. The only form seen in the present series of cases is that associated with encysted hydrocele of the cord, which will be referred to later.

Nine patients had double inguinal herniæ, while of those which were unilateral 97 were on the right side and 27 on the left side.

STRANGULATED HERNIA.

Strangulated hernia is comparatively uncommon in children as compared with the adult, although recent literature on the subject would seem to point to its being more common than is stated by Stern, namely, 1 in 108. Stiles, in a recent paper, reports 15 cases out of 360 consecutive operations for radical cure.

In the present series of cases strangulation occurred in 6. In 5 of these the child was under one year.

Moynihan has published tables of a large number of collected cases showing that strangulation is most common during the first month of life, gradually becoming less frequent up to 1 year, while of Stiles' cases, all, with one exception, were under 18 months.

In my own cases the ages were 2 weeks, 3 weeks, 4 months, 7 months, 9 months, and 15 months. The contents of the sac was in 5 cases that portion of the ileum within 6 in. of the caecum, while in the child aged 15 months the caecum and vermiform appendix were in the sac. The sac was funicular in 5 cases, but in the child of 2 weeks old was vaginal. In the child aged 3 weeks, a weakly anemic infant with eczema intertrigo of the buttocks and groins, death occurred two days after operation from sepsis.

All the strangulation cases occurred on the right side.

CONTENTS OF THE SAC.

In the large majority of cases the radical cure was performed while the sac was empty, but of those cases in which the contents were present in the sac or were pulled down into the sac before ligaturing its neck, the following was the relative frequency of the different abdominal contents:

Caecum and vermiform appendix	9
Small intestine	8
Bladder	3
Omentum	2
Sigmoid flexure	1

That this does not give a true proportion of their relative frequency is probable, as the caecum and vermiform appendix are less easily reducible than portions of the small intestine, so that the figures given may represent a greater frequency of the former than is actually the case, while the occurrence of the bladder as a content may be stated to be more frequent than is the case, for reasons which will afterward be explained.

The vermiform appendix was removed in 7 cases in which it was present in the sac. It was healthy in 5 cases, while in 1 it was tuberculous, and in another markedly thickened and contained a fecal concretion. In two cases the omentum alone was found in the sac, which was a complete vaginal in one instance, the end of the omentum being firmly adherent to the testicle. In 1 case the sigmoid flexure was present in a left-sided funicular sac. The hernia was large and irreducible before operation.

HERNIA OF THE BLADDER.

The bladder was seen in 3 cases of radical cure performed.

The first case was that of a child, aged 4 months, with left-sided hernia. After exposing and isolating the sac, and on freeing it towards its neck, a lobule of extraperitoneal fat was noticed on the inner aspect of the neck of the sac. On pulling this down what appeared at first to be a second sac protruded, which however, was non-peritoneal, and on further examination was found to be the bladder.

In the second case, that of a child aged 3 years, a small portion of the bladder was found on the inner side of the neck of the sac on the right side.

In the third case, that of a baby of 11 months old, on splitting the coverings of the cord, a swelling was found filling up the whole inguinal canal, like a thickened sac covered with extraperitoneal fat. It was opened, the wall being found distinctly thicker than even the thickest of sacs. Expecting it to be the bladder, one finger was passed in and the posterior aspect of pubis and internal orifice of the urethra could be palpated from within the bladder. The whole organ was very flaccid, and was pulled out into the wound, and the incision in its wall stitched with a double row of sutures. A very thin peritoneal sac was found after returning the bladder.

One can consider the third case only as a true hernia of the bladder, for Cases 1 and 11 were more or less artificially caused by manipulation during operation. The conditions which would seem to favor hernia of the bladder are, first, a thin abdominal wall with badly-developed muscles, as was present in all these cases; secondly, a wide external abdominal ring and an inguinal canal which is short and straight.

In nearly all cases reported there is an abnormal development of the prevesical extraperitoneal fat. It can be proved experimentally, by traction on the extraperitoneal connective tissue and fat, that this has a much more intimate connection with the bladder than has the peritoneum, and one should always suspect the close proximity of the bladder if, after isolating the neck of the sac, a marked development of fat is noticed on its inner aspect, especially if associated with a large canal and thin abdominal wall. The contents of the spermatic cord are always relatively free of the protrusion, which should raise suspicion as to its nature. As in the case mentioned, the peritoneal sac may be thin and small without any distinct neck, owing to the fact that on the inner side it passes on to the upper and posterior wall of the bladder, so that in the first instance the anatomical conditions are somewhat confusing. The portion of the bladder which projects is the anterior portion, so that the hernia is extraperitoneal.

Shepherd, in a recent contribution on the subject, considers that the bladder is present in 1 per cent. of inguinal herniæ. In 75 per cent. of cases it occurs in males.

ENCYSTED HYDROCELE OF THE CORD AND HERNIA.

Eight cases presented this condition; 5 of them were between the ages of 1½ and 2½, the other 3 being 10 months, 5 years, and 10 years respectively; 4 were right-sided and 4 left-sided. In 4 the hydrocele was the size of a pigeon's egg, in the others it varied from the size of a marble upwards.

It is always well, when an encysted hydrocele is present, to take for granted that a hernial sac is also present above it.

Lockwood describes the condition as a form of infantile hernia. In dissecting out an encysted hydrocele of the cord, if a little care is used so as not to burst it when doing so, as one reaches the upper extremity of the spindle-shaped swelling, one can often detect a loose projection of peritoneum overlapping and passing down on to the wall of the hydrocele. By slitting this with the scissors, a sac entirely separated from that of the hydrocele leads up into the abdomen. It is well to isolate this more freely, and ligature it as high up as possible, otherwise a short peritoneal funnel is left after removal of the hydrocele, which may enlarge to form a hernia subsequently.

In all the cases above mentioned such a sac was present, and one cannot help believing that it is present in the majority of encysted hydroceles. Closure probably occurs at one point in a patent funicular process, and the lower closed sac, as it distends, bulges the upper extremity past the seat of occlusion, giving rise to the overlapping which is present. This is the only type of so-called infantile hernia I have seen.

TUBERCULOSIS OF THE SAC.

This was noted in 4 cases. In 1, that of a boy aged 5 years, two pealike nodules of granulation were present at the apex of the sac, while in 2 patients aged 5 and 18 months, small sago-like tubercles were dotted over the sac. The fourth case was one in which the vermiform appendix was tuberculous, and numerous glands were present throughout the abdomen.

INGUINAL HERNIA IN THE FEMALE.

Inguinal hernia in female children is relatively common. Nineteen occurred in the series of 152 cases, giving a percentage of a little over 12.

There is generally a small reducible swelling over the external abdominal ring. It rarely passes down into the labium majus as in the adult female. In only 4 cases were any contents present in the sac. The omentum lay loosely in the sac in a girl aged 10½, while in two children, aged 13 months, and another aged 3 years, the ovary and Fallopian tube were the contents.

In one case the sac was tuberculous, a nodule of granulation being felt, resembling very much the ovary before operation.

When the ovary is present in the sac the Fallopian tube is almost always also present. Hernia of the ovary occurs in the majority of cases through the inguinal canal. Femoral ovarian hernia only occurs in the proportion of 1 to 9, according to Devreux, as compared with the inguinal form, or 17 to 91 according to Bitzako. Femoral hernia generally occurs in adult life and is acquired, while the inguinal form is generally congenital.

The congenital forms are almost always associated with abnormal development of the uterus, etc. According to Puech, 33 out of 88 cases had congenital malformation, while the acquired form in adult life is associated with normal genitalia. The explanation of the occurrence of the congenital form is to be found probably in the development of the canal of Nuck, caused by a protrusion of the peritoneum following the round ligament, like the testicle and funicular process. The relation of the ovary and testicle to the peritoneum is different, the former lying within the sac and the latter outside it, so that the analogy of ovarian hernia with the descent of the testicle fails in this respect. The relation of the round ligament to the canal of Nuck is an interesting one. According to Waldeyer, the peritoneum covers the round ligament above and in front, but does not surround it, while Devreux considers it is attached to the apex of the so-called canal of Nuck. In the cases operated upon the round ligament appeared distinct up to the apex of the sac and then seemed to spread out and become lost on the exterior of the sac. Puech believes such inguinal herniæ are always due to a shortening of the round ligament, while Lockwood believes the condition to be due to an abnormally long mesentery.

It is not always easy to reduce the ovary and Fallopian tube into the abdomen in those cases in which they lie well down in the sac.

The sac is apparently formed by the portion of parietal pelvic peritoneum which gives off the broad ligament, or by the separation and spreading out of the two folds of the broad ligament. as in the two cases in which the ovary and Fallopian tube were present; they were firmly attached to the posterior wall of the sac by the mesovarium and mesosalpinx. In both cases these two folds of peritoneum had to be divided in order to reduce the organs.

In the published cases of ovarian hernia in the adult, the ovary apparently functionates, as it has been noticed to swell and become sensitive at the menstrual periods, and it is interesting to note with regard to this, that, in some cases of double ovarian hernia, one ovary alone swelled at a menstrual period and the other at the next period, as if they functionated alternately during menstruation.

This would seem to show that the abnormal position of the ovary does not interfere with its function, and cases of ectopic gestation in the hernial sac have also been recorded. The question, then, comes to be: Are we to treat the displaced ovary like an undescended testicle, and remove it?

Those that reach adult life in the abnormal position are generally sensitive, and microscopically show changes due to chronic ovaritis, and are liable to give rise to symptoms of obstruction such as are presented by torsion of the testicle, or pass on to cystic and other forms of degeneration.

One cannot consider it justifiable to remove the ovaries, or even one ovary in a young child, as some authorities would advise, even though the chances of their ultimately causing trouble are considerable.

I have examined a large number of ovaries in children, removed at different ages *post mortem,* and have been struck by the fact that not only the anatomical position but also the size, shape and thickness varies very considerably at the same age in different children. I have seen the ovary long and flat in one child, while short and thick, resembling a small bean, in another child of the same age, so that one cannot argue from the shape and size as to whether the ovary is normal or not. The differences are much more striking than in the adult, so that an ovary in a young child which is apparently thickened and enlarged is not necessarily pathological.

By dividing the mesovarium and mesosalpinx, the ovary and Fallopian tube can be freed sufficiently to be returned within the ring, and unless gross changes are apparent it is not justifiable to remove the organ.

ILLUSTRATION OF THE IMPORTANCE OF RECTAL EXAMINATION IN CHILDREN.[1]

BY J. PORTER PARKINSON, M.D., M.R.C.P.

Though it is nearly ten years since Dr. George Carpenter, in PEDIATRICS, pointed out the great value of rectal examination in the diagnosis of certain diseases of children, this method of examination is but rarely carried out, except perhaps by those physicians who study especially this branch of medicine. The importance of this method of examination in a large number of abdominal diseases in infants and children cannot be over-estimated, and the ease with which it can be carried out is much greater than can be imagined by those who do not habitually practise it. The looseness of attachments of the rectum and sigmoid flexure in the young child makes it easy to explore the greater part of the abdominal cavity, so that in infants at any rate the kidneys and the under-surface of the liver can be palpated, and any tumor or thickening made out by the examining finger. If slowly introduced, the well-lubricated finger causes in most cases but little discomfort, and chloroform is rarely necessary, except in the case of inflammatory diseases of the pelvis when tenderness is naturally present, and an anesthetic is called for.

In some cases of chronic diarrhea, which do not yield to treatment, or in cases of bleeding from the anus, the examination of the rectum will show the existence of a polypus or of some foreign body, the irritation of which has caused the symptoms. In cases of intussusception it is well known that the intussusceptum advances along the colon, and is often to be felt by the finger in the rectum; it may, however, often be felt in an early stage by the examining finger. For example, a case occurred at the London Temperance Hospital in a female child aged 4 months, which on December 26, 1903, suddenly began to vomit and to pass bright blood and mucus per rectum; this continuing, she was brought to the hospital two days later. On abdominal examination under chloroform, I was unable to make out anything abnormal, but on passing the right index-finger into the bowel, I felt a sausage-shaped lump on the left side of the abdomen, which could be palpated with moderate distinctness; this, as the abdominal section subsequently showed, was an intussusception. In this case the symptoms were very suggestive, but there are many cases of intussusception in which they are very obscure, and a rectal examination may be of the greatest assistance.

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[1] Practitioner.

Of recent years many cases of diseases of the female generative organs have been described, and many operations have been described for the removal of ovarian cysts in children. It has been also shown that cases of vulval discharges are frequently gonorrheal in origin, and in such cases the inflammation may extend upwards to the Fallopian tubes and ovaries, causing pyosalpinx, ovaritis, and pelvic peritonitis.

A case in which this happened was described by Dr. George Carpenter in the "British Journal of Children's Diseases," the diagnosis of involvement of the pelvic organs being made by bimanual rectal examination. The Fallopian tubes and ovaries were found to be enlarged, and on one side considerably distended, probably with pus. This patient, as is no doubt often the case, recovered without operative treatment. Dr. Carpenter remarks that there is now a large number of cases of localized gonorrheal peritonitis in little girls on record, but that bimanual examinations of the internal genitalia are commonly omitted, and as many cases tend to spontaneous recovery, the disease of the uterine appendages is often passed by.

It is important that, in cases of gonorrheal vulval discharges, the condition of the pelvic organs be examined, in order that a further extension of the mischief be prevented, if possible.

A rectal examination in cases of disease of the appendix is now recognized to be imperative, as an abscess, of which there is no indication in the abdomen, may be easily felt by rectal examination.

Enlargement of the lymphatic glands in the hollow of the sacrum is sometimes an indication of disease which can be gained only by the same method.

In cases of tuberculous peritonitis, the local matting of the bowel and collections of pus may be easily felt, and the enlargement of mesenteric glands made out; in cases of difficulty the diagnosis may be best made in this way, and the stage and progress of the disease noted.

Recently a child aged 2 years was admitted under my care in the London Temperance Hospital for severe constipation, which had been gradually increasing for several weeks, and during the last fortnight the abdomen had been noticed to be distended, and the child had occasionally vomited. On admission the child was noticed to be thin and the abdomen greatly distended, especially on the left side, where in the iliac and lumbar regions peristaltic movements were to be seen, and the distended bowel could be felt by the hand. The abdomen was not tender, and was resonant on percussion. A transverse ridge could be felt across the abdomen just above the umbilicus, but no other masses were made out. The temperature was 100° F. on admission, but soon fell and remained below normal, fluctuating between 96.4° F. and 98.4° F. daily.

An enema brought away large fecal masses, containing much undigested matter,after which the bowel was emptied by purgatives. The swelling of the abdomen soon was relieved. An examination per rectum then revealed a solid flattened irregular mass lying in the hypogastric region, to which was attached a curved elongated hollow mass, evidently a portion of the small intestine fixed by adhesions. The child's general condition improved greatly by a fortnight's stay in the hospital, but the condition found by rectal examination did not alter. There is little doubt that there was some chronic matting of the bowel, due, no doubt, to tubercular deposit in the peritoneum, and the diagnosis was much assisted by the examination by the bowel.

The following case illustrates the value of this method of examination in abnormal conditions in the upper regions of the abdomen. A female child, 3 weeks old, was admitted into the wards of the North-Eastern Hospital for Children for a swelling of the abdomen, which had existed since birth, and which had been rapidly increasing. The infant was thin and pale. The abdomen was much swollen, especially in the right hypochondriac region, in which could be felt a smooth roundish solid lump, moderately moveable, and extending downwards to below the level of the umbilicus and across to just beyond the median line of the abdomen. It was dull on percussion, and the dulness was continuous with that of the liver. It was obviously a tumor, either of the kidney or of the liver, and by the ordinary clinical methods one was unable to say which. By rectal examination, however, the kidney could be distinctly palpated, and the tumor was found to lie quite in front of it, and was evidently not attached to it in any way, for the finger could be passed freely between the tumor and the kidney; it could also be felt continuous with the liver. Hence the diagnosis of a liver tumor was made, and an abdominal section being performed by my then surgical colleague, Mr. H. I. Curtis, a sarcoma of the liver was found. It was unfortunately so connected with the liver as to be inoperable, and the abdomen was closed.

The following case shows how even small objects in the cavity of the abdomen may be felt by the rectal examination. I am indebted to my colleague, Mr. Douglas Drew, for permission to publish extracts from the notes. S. T., aged 4 years, was admitted to the North-Eastern Hospital on account of vomiting and passing a diminished amount of urine, which contained pus and a small quantity of albumen. There was some pain at the tip of the penis and in the left inguinal region. A renal stone being suspected, the bladder was sounded, and a stone felt, which was removed by suprapubic cystotomy. The patient did not progress favorably, and the vomiting persisted, and another stone was passed per urethram, and occasional attacks of severe pain in the inguinal region occurred. After repeated examinations, a shadow was seen by the X-rays just above the loin of the pelvis on the left side. Chloroform being administered, on abdominal examination the left kidney was found to be enlarged, and the finger in the rectum felt a hard triangular body, about the size of a hazel-nut, on the left side of the abdomen just above the upper limit of the bladder; this was taken to be a stone impacted in the ureter. At the operation which followed immediately this diagnosis was verified in all details, and another stone was also removed from the pelvis of the left kidney. Unfortunately the opposite kidney was so diseased from the presence of numerous calculi that the patient died a fortnight later.

This case illustrates, I think, the extreme delicacy of this mode of examination; a very small object, the existence of which could not be even suspected by abdominal examination, was so easily palpated that its exact size and shape were described.

It would be useless to add further examples to these already given, which show the delicacy of the method and also the extent to which the abdomen may be palpated, and it was especially to show the great value of this examination in obscure diseases within the abdomen that this paper has been written.

SOCIETY PROCEEDINGS

NEW YORK ACADEMY OF MEDICINE

(Pediatrics Section.)

February 8, 1906.

Dr. M. Nicoll, Jr., Chairman.

The Dosage of Diphtheria Antitoxin from an Experimental Standpoint.—Dr. W. H. Park discussed this subject, and said that the question was how much antitoxin should be injected into the tissue in order to neutralize the diphtheria toxin produced by the disease. If the toxin as it was manufactured in the tissues could be met by the antitoxin injected, a large amount of the latter would probably not be required, as experiments upon animals made it probable that in no case did the tissues contain more than ten fatal doses for a man twenty-four hours before death, and this amount would not neutralize more than 100 units of antitoxin. It took longer for the antitoxin to get into the diseased tissues when given subcutaneously than when administered intravenously, therefore in desperate cases where immediate effect was imperative, it was best to inject into the veins. As to the question of one dose or repeated doses, Dr. Park was of the opinion that although a single dose was often sufficient in moderate cases, the severe cases were better treated by repeated doses. In some cases even a large single dose seemed insufficient. It was important that the antitoxin should be promptly administered. Experiments seemed to show that only a few hours could pass after the blood had absorbed a fatal dose of toxin before the time when the antitoxin could have no effect, and the more toxin was absorbed the shorter this period would be. Dr. Park had studied experimentally the effect of small and of large doses, and was sure of certain points concerning them; 1,000 units as a first injection was certainly not enough, and in severe cases there was no doubt that the patients given 3,000 did better than those given 2,000. With doses larger than these the difference in the results was less, and between 6,000 and 12,000 none could be noted. He did not believe that any patient ever required more than 20,000 units in all, but he had seen 30,000 and even 50,000 administered without any bad results whatever.

The Dosage of Diphtheria Antitoxin as Administered

IN THE HOSPITALS OF THE DEPARTMENT OF HEALTH.—A communication on this subject by Dr. W. E. Studdiford was read by Dr. Park. Most of the patients were received at the hospital on the third day of the disease, and about one-third of the deaths occurred within twenty-four hours. The Riverside Hospital mortality was 7.5 per cent., in the tube cases taken alone, 45 per cent. The maximum dose of antitoxin was 40,000 units, the minimum 2,000. At the Kingston Avenue Hospital the maximum dose was 45,000 units, the minimum 2,000.

NEW PREPARATION OF ANTITOXIN.—Dr. Park said that for years he had thought that they should get rid of the matter in the antitoxin which produced rashes, joint symptoms and the like. In 1900 the chemist in the Board of Health Research Laboratory got rid of all but the globulin, but rashes were as frequent of occurrence as ever. About 18 months ago one-third of the globulin was also eliminated. Rashes still occurring and the experimenter trying one combination after another, came to the conclusion that the condition under which the globulin existed rather than its presence was responsible for the undesirable effects. Acting on this, he now had a serum which was less apt to produce rash, which after another month would be furnished by the department, in two strengths, 500 units per c. c. and 800 units per c. c. It would not harm the patients to receive 15,000 or 20,000 units, but where so much was not needed it should not be given, since it inflicted needless expense on either the individual or the state. Dr. Park wished to be informed if rashes developed when the new serum was used.

Dr. John S. Billings, Jr., reported that the inspectors of the Department of Health administered antitoxin in 2,849 cases last year, in Manhattan. The total death rate from diphtheria in that borough was about 8 per cent. In Brooklyn it was about 12 or 14 per cent., in Queens, 13, and in the Bronx 20. From 2,000 units to 7,000 were used by the inspectors as an initial dose, as a rule, although in very severe cases they might use more, sometimes even 10,000.

THE DOSAGE OF DIPHTHERIA ANTITOXIN IN PRIVATE PRACTICE.—Dr. C. G. Kerley said that more definite rules for the administration of diphtheria antitoxin could be formulated than heretofore. When it first came into use 1,000 units was the initial dose, whereas at the present time many physicians habitually gave 5,000 or more, even when the patient was seen on the first day. Dr. Kerley made no age distinction in the dosage, but gave 5,000 units on the first or second day. In non-laryngeal cases this was generally enough, but if improvement was not evident in eight or twelve hours the dose was repeated. If the membrane had extended, 10,000 units should be given, and for patients seen on the third day, when toxic symptoms were marked the initial dose consisted of 10,000 units, repeated at from ten to twelve-hour intervals; 5,000 units were used as an initial dose in laryngeal cases repeated in eight hours if necessary. He thought that laryngeal intubation cases always needed from 10,000 to 15,000 units, even when it was given early. Even in moribund cases antitoxin should be administered; 3,000 units were sufficient for mild nasal cases without fever, and 1,000 was the immunizing dose.

Dr. B. F. Royer, of Philadelphia, discussed Dr. Kerley's paper, and said that experiments had demonstrated that nothing could be done with toxin which had been twenty-four hours absorbed. He thought it advisable to have antitoxin dispensed in larger doses than at present. At the Municipal Hospital in Philadelphia they had determined the dose according to the amount of pseudomembrane, its location and the duration of the disease. Age was not regarded as a determining factor. The following initial doses were used in the various conditions enumerated: One tonsil covered with pseudomembrane, 2,500; both tonsils, 5,000; both tonsils and pillars or uvula, 7,500; nares and larynx, 7,500 to 10,000; tonsil and larynx, 7,500 to 10,000. He advised intervals of twelve and twenty-four hours with the larger doses, twelve in those cases showing great prostration and angina. Patients admitted on the first day had all recovered, those on the second day showed a mortality of five per cent. and those later a higher one.

Dr. L. E. Holt thought the amount of membrane a better guide than age, and advocated a large initial dose, given early.

Dr. W. P. Northrup also spoke of the importance of early treatment with a dose of 5,000 or 6,000 units.

Dr. Henry W. Berg used the pulse as a guide, and if this did not go down within twenty-four hours he repeated the dose. He had never had occasion to inject more than 6,000 to 7,000 units.

Dr. Henry Koplik thought that the chief difficulty lay in the cases which developed complications, as uncomplicated cases were easily handled.

Dr. H. N. Mason said that at the New York Infant Asylum four hundred patients had received immunizing doses within the last four months, and none of them had contracted the disease when exposed to it; 1,000 units was given adults and 500 to children.

Dr. L. C. Ager, of Brooklyn, said that an unfortunate result occurring after the giving of antitoxin by a prominent physician of that borough had created there a prejudice against the treatment.

Dr. L. E. LaFetra said that it was very important to see the patients often and ascertain if improvement had taken place. If improvement did not follow the first dose the dose had been too small. He gave 3,000 to 5,000 units as a first dose, and if the membrane did not begin to curl up within twenty-four hours another dose should be given.

Dr. L. E. Holt thought 3,000 units a reasonable early dose in the majority of cases.

Dr. C. G. Kerley thought it better to give 6,000, even if more than required it would do no harm.

Dr. Park, answering a question by Dr. Royer, said that antitoxin injected subcutaneously was absorbed about one-half as rapidly as when injected into the muscles, but when injected into the vein, it was, after an hour's time, six times as abundant as when injected under the skin. He believed that all agreed that the first dose should be large, and that if no improvement appeared within twelve hours, a second or even when necessary a third dose should be given. He thought 1,000 sufficient for an immunizing dose. Its effect would last ten days, when it might need to be repeated. In answer to a question from Dr. Berg, Dr. Park said that where death threatened, injection into the vein was advisable, but not in ordinary cases. No reports of bad effect from such injection were on record.

EDITORIAL

MOUTH BREATHING NOT DUE TO ADENOIDS

With the tendency to increase the scope of medical inspection and attend more scrupulously to the less conspicuous physical defects of the young, parents have come to believe that almost any sort of defect, physical or mental, can be traced to the influence of adenoid vegetations, where these exist. It is, therefore, a keen disappointment, when, as sometimes happens, the deafness and mouth breathing continue after the removal of the adenoids. In such cases the real cause of the mouth breathing is not the vegetations, but a congenital narrowness of the nasal passages, and it will be noticed that patients in whom this occurs have a characteristic facial architecture, with narrow nostrils, a high arched palate and an irregular V-shaped dental arch with teeth crowded together. The effect of this condition is explained by Dr. Löhnberg in the *Deutsche Medizinische Wochenschrift* as due to disordered action of the muscular apparatus,which normally regulates the opening and closing of the ostium pharyngeum tubæ. The naso-pharynx is so narrow that the levator palati is made to take an abnormally vertical course, and to act too forcibly. That the Eustachian obstruction is mechanical and not inflammatory is proved by the absence of signs of catarrh. As much as twenty years ago, Eysell of Cassel proposed to correct the deformity in such palates by a dental apparatus, and in 1898 Schröder, a dental surgeon, attempted to carry out this idea. The apparatus which he first used to widen the palate and superior maxilla was made of vulcanite and completely covers the palate and teeth. As it must be removed several times a day for purposes of cleanliness, the stretched alveolar arch comes back to its former shape. But in 1902 he devised another apparatus which was free from this objection. A gold plate, covering the alveoler processes of the superior maxillæ, is firmly fixed to the teeth with gold bands. The two plates are connected by a transverse rod, which is cut through the middle line and again joined by a screw, the tightening of which forces them apart Of course, great caution is used in this application of force, and the process is very slowly and gradually accomplished. If the teeth are sound, the apparatus need not be removed during the entire treatment, which lasts from six months to a year. Dr. Löhnberg is convinced that with Schröder's apparatus not only are the arch of the palate and the dental arch widened, but the entire architecture of the bones above them is modified. The superior maxillæ and palate bones are forced apart, the orbits are also more widely separated, and the base of the skull becomes broader. He thinks it possible, moreover, that this procedure might prevent the occurrence of deviation of the septum nasi.

He illustrates his contentions with the history of an interesting case, that of a little girl in her fifth year, who had had tonsils and adenoids removed two years previously. Her expression was typically "adenoid," she breathed constantly through her mouth, and was deaf. Dr. Löhnberg first saw her in September, 1901, and noted that the arch of the palate was narrow and high, the teeth irregular, with prominent incisors, the nose small and the nostrils narrow. A few adenoids were present and were removed and the child treated by Politzerization for several months. Breathing exercises, courses at health resorts and treatment of the nasal mucosa chemically and by galvano-cautery were all employed, and in 1903 the pharynx was again curetted, but without permanent improvement of either breathing or hearing. Happily, different results were secured by the use of the Schröder appartus, which was applied in 1904. The child now breathes entirely through the nose, and her hearing is normal, while the face has lost its "adenoid" expression. The teeth in the upper jaw have become regular, and the one defect is their failure to meet the lower ones exactly when closed. Altogether the success of the treatment was striking, and in cases of such a nature the orthopedic treatment outlined by Dr. Löhnberg promises relief of otherwise baffling conditions.

ABSTRACTS

Acute Yellow Atrophy in a Child.—WENTWORTH (Archives of Pediatrics, New York, February, 1906). Wentworth reports a case of acute yellow atrophy occurring in a boy of 5 years. At 18 months the patient had tuberculous peritonitis, from which he recovered without operation in about six months. At the age of 3½ years he had lobar pneumonia of the left lower lobe. The first symptom of the final trouble was a slight jaundice. This was followed in a day or two by vomiting and a slight degree of malaise. The child was about the house and out of doors until within four days of his death. On the sixteenth day of his illness he became delirious. The urine was negative. A diagnosis of the condition was not made during life. When the abdomen was opened at autopsy firm adhesions were found everywhere. The liver was not diminished in size, and the cut surface presented areas of a bright greenish-yellow color on a dark red background. The most striking feature of the case was the extreme degree of destruction of liver with the absence of macroscopic signs of atrophy. The liver cells were destroyed in at least three-quarters of the liver. The urine had not been examined for leucin and tyrosin.

Unusual Case of Tuberculosis.—TOWNSEND (Archives of Pediatrics, New York, January, 1906). The patient, whose case is reported by Townsend, was the second child of exceptionally healthy parents. The family history was good. The only cases of consumption in the family were remote and occurred in collaterals. The food of the child was breast milk for the first seven months, at the end of which cow's milk, modified with cereal water, was given. This milk was of the best, coming from cows that were frequently tested for tuberculosis and whose milk was used especially for infants. The infant received no other food. At the age of nine months the child was suddenly taken sick with fever and vomiting. The fever continued for over two months and ended in death. During all this time nothing was found on physical examination, except a slight otitis media of one ear. The drum was punctured and a thin serous fluid escaped. Several times in the course of the disease the ears were examined, but nothing abnormal was found, so that otitis as a cause of the fever was ruled out. In this way several other causes of fever were eliminated. The fever varied irregularly from 100 to 104 F. and was often higher in the morning than at night. On several occasions it became normal and once or twice it was subnormal. The general course of the fever was lower during the last two weeks of the disease. At the end, however, it mounted rapidly above 106 F. The infant's digestion was good during nearly the whole course of the disease. During the last month, however, vomiting and disinclination to take food became prominent features. Bile was often vomited. There appeared to be no evidence of intestinal or of gastric indigestion, or of accumulation from pyloric stricture, and it was believed that the vomiting was reflex from the fever. Thorough evacuations with calomel had no effect on the fever. The autopsy showed extensive tuberculosis throughout the peritoneal cavity.

Congenital Malformation of Heart.—ELLIS (American Medicine, February 17, 1906). Among 3,875 autopsies performed at the Philadelphia Hospital during the past thirteen years Ellis found 46 cases of cardiac malformation. Four cases are described at length. One is a case of the rare condition of pectoral heart with divided sternum; the child was a full-term male and lived twenty-three and a half hours. A second case is one of transposition of the aorta and pulmonary artery, the child living thirty-four days. The third and fourth cases are instances of perforate interventricular septum and absence of anterior portion of auricular septum, respectively.

The Blood in Children with Adenoid Vegetations.—SCHEIER (Zeitschrift f. klinische Medizin, Berlin, lviii. nos. 1, 2). Scheier found the proportion of hemoglobin about 13.8 per cent. below normal in the children with adenoid vegetations whom he examined. The red corpuscles were about the usual number, but there were always from 14,000 to 17,000 white corpuscles, and sometimes 21,000 and 24,000. The small and large lymphocytes were unusually numerous, and the multinuclears somewhat diminished. A slight degree of chlorosis with leucocytosis, specially lymphatic, was the rule. Removal of the growths caused improvement; the hemoglobin rose to 74, 80 or 92 per cent. in the course of from one to several months afterward, while the leucocytosis declined. In conclusion he remarks that the adenoid vegetations in the nasopharynx are not the only manifestations of hyperplasia in the lymphatic system. The lymph glands in the neck and under the jaw are always more or less swollen in these cases. The swelling almost invariably subsides after removal of the adenoid vegetations, and the somewhat low blood pressure rises to approximate normal.

Anesthesia for Children.—GUIMARAES (Brazil-Medico, xviii. 36). The author advocates chloroform for long operations and ethyl chlorid for short ones when they are to be performed on children. Spinal anesthesia is good and effectual, but it frightens the children too much.

Inheritance of Tuberculosis.—BOSSI (Archiv. f. Gynäkologie, lxxvii., No. 1). Bossi's article is a contribution from an obstetrician to our knowledge of tuberculosis. He examined large numbers of placentae and of fetuses from women with tuberculosis, supplementing his research by experimental work. He found that it was a very rare exception when the Koch bacillus was transmitted to the fetus from the parents during its intrauterine existence. The toxins of tuberculosis may be transmitted. They seem to accumulate in the placenta and to pass thence into the fetus. The toxins thus transmitted are responsible for the defective development and organic weakness noted in such children. They favor infection during early infancy.

Hypertrophic Stenosis of Pylorus.—ROGERS and HOWLAND (Arch. of Pediatrics, March, 1906). The authors report a successful operation on an infant three months of age, suffering from hypertrophic stenosis of the pylorus. The symptoms were typical. A posterior gastrojejunostomy, without a loop, was carried out with sutures. The length of the operation was twenty-five minutes.

Fat Problems in Infant Feeding.—BELL (Arch. of Pediatrics, March, 1906). As the result of clinical observation and experimentation Bell concludes that the digestion of fat retards the flow and diminishes the amount of gastric juice, at the same time lowering its digestive power. The ingestion of fluid oil increases the flow of pancreatic juice and probably the activity of its fat-splitting enzyme, steapsin. In case the fat is not fluid at body temperature, he states, it may still further retard and prevent the flow of gastric juice, coating over the gastric mucous membrane, thereby mechanically interfering with secretion. In the case of coagulable food, such as caseinogen, it may cover the curds with a layer of insoluble fat, thereby preventing the action of gastric juice on them, though the juice be secreted in sufficient amount and power, and also by preventing the action of the trypsin on them, though brought in contact with an increased supply of pancreatic juice, assuming that the action of the steapsin on the fats will be partially nil, or at least much impeded by the insolubility of their fat-covering permitting the curds to pass undigested. If goat's milk fat more closely approximates human milk fat than that of cow's milk, and if the proteid and sugar constituents are not more incompatible than in cow's milk and if there exists no serious commercial obstacle, goat's milk merits an extensive and thorough clinical trial in infant feeding.

Meningitis in Infancy.—J. L. Morse (Journal A. M. A., June 23). In the forty cases analyzed the diagnosis was made in every case by autopsy or lumbar puncture. A marked predominance of mononuclear cells in the spinal fluid was considered diagnostic of the tuberculous form, and of polynuclear cells of the cerebrospinal form. The meningococcus was found in all but three of the cerebrospinal cases. His careful analysis of the symptoms shows quite a different picture from the usual one given in the text-books; in only four of the cerebrospinal type was there the usually looked for sudden onset and in seven of them there were no symptoms pointing directly to the nervous system until after several days or two weeks. On the other hand, the onset was sudden, with convulsions or stupor in four of the tuberculous cases. The short duration in many of the tuberculous cases and the long duration of many of the cerebrospinal cases was also very striking. The tuberculous form has a more sudden onset and a shorter course than in the adult, and the symptomatology of the two types is essentially the same, there being only a slight predominance of signs of spinal and to a less extent of cerebral irritation, in the cerebrospinal form, but not enough to justify a differential diagnosis. A positive diagnosis between the two forms is impossible by the symptoms alone, and can be made only by examination of the cerebrospinal fluid obtained by lumbar puncture. A high leucocytosis may be present in tuberculous meningitis, as well as in the other form, though not so characteristic. The history of the case is of value in making the diagnosis, but it is often wanting. Lumbar puncture has no curative value in cerebrospinal meningitis, but is very useful for the relief of symptoms in both forms. Twenty cases of each form, all in patients in the Infants' Hospital, Boston, furnished the material for the study.

Tuberculous Peritonitis in Children.—Faludi (Jahrbuch für Kinderheilkunde, lxii. 3). Faludi sifts the literature on this subject and reviews the material at the Stephanie Hospital, his conclusions being all in favor of laparotomy at the earliest moment in cases of ulcero-caseous or fibro-adhesive tuberculous peritonitis in children. The results are liable to be excellent in such cases. In the form with effusion, hygienic-dietetic treatment should first be given a thorough trial. If it fails or is not convenient, then laparotomy should be done without delay. Punctures should not be attempted. A serious tuberculous affection in another organ is a contraindication to laparotomy, but not so fever or debility. Circumscribed tuberculous inflammation in children always demands surgical intervention. The after-treatment in all these cases is of vital importance, the dietetic and hygienic measures being supplemented by the proper anti-tuberculosis medication.

Venesection in Scarlatinal Uremia.—SINGER (Jahrbuch für Kinderheilkunde lxxii. 3). Singer advocates venesection as the most rational and beneficial measure in scarlatinal uremia. It is especially indicated in cases showing symptoms indicating irritation of the brain. When there is a tendency to coma and depression, venesection can do no harm, but not much can be hoped from it at this stage. It is applicable to both robust and weakly children. If the pulse is filiform, the internal organs are generally irreparably injured at this stage and the operation is generally useless. Venesection should be done as early as possible, during the first uremic attack. The amount of blood to be withdrawn must be decided by the age, strength and severity of the attack. Venesection can be repeated at need after from twenty-four to forty-eight hours. Baginsky thinks that from one-fifteenth to one-twentieth of the total amount of blood can be let out without danger. In Singer's 17 cases of acute scarlatinal uremia treated by venesection, all the patients recovered but 2, that is, the mortality was 12 per cent. In the 9 cases treated without venesection the mortality was 56 per cent.

Teratoma of Thyroid Gland.—FLESCH and WINTERNITZ (Jahrbuch für Kinderheilkunde, lxxii. 3). Two cases are reported, both cured by operation. They were in infants of 2 and 8 months, respectively. If such a tumor causes no disturbance it might be advisable, he states, to wait until the child is from 1 to 3 years old, but in case symptoms develop earlier prompt interference is required. The total excision of the tumor, as large as a fist, in the left lobe of the thyroid, was borne well by the 8 months' infant. Careful preliminary ligation of the vessels is indispensable. Cartilage tissue was prominent in each of the tumors removed. The tumor in the younger infant originated in the isthmus and was readily removed, the infant being dismissed in good health a week later.

Ovarian Tumors in Children.—WINTERNITZ (Jahrbuch für Kinderheilkunde, lxxii. 3). Winternitz reports 4 cases cured by operation. The tumor was an embryoma in all but one.

Palpation of the tumor usually differentiated the ovarian growth, but appendicitis had been diagnosed in one instance. In this case a dermoid cyst of the ovary, after torsion of the pedicile had suppurated and perforated through the abdominal wall.

Bladder Stones in Children.—WINTERNITZ (Jahrbuch für Kinderheilkunde, lxxii. 3). The tabulated results of Winternitz's operations for bladder stones in children certainly speak in favor of his technic. He crushes the stones and removes them by suction through a tube when the concrements are movable and crushable, the bladder and upper urinary passages free from infection, and the urethra at least as wide as a No. 16 Charnière sound. When the urethra is smaller than this, or when obstinate catarrh of the bladder or posterior urethra resists treatment, then he resorts to the high incision. He examines with the cystoscope to see if any fragments have been left behind after crushing the stones, and on this account does not attempt to crush them when the children are too small to allow the introduction of the cystoscope. He tabulates the details in 28 cases.

Infants' Bath Tub.—(Muench. Med. Woch). At Escherich's clinic the infants sleep in an oval basket which fits into an iron standard. When the basket is lifted out, a sheet is laid over the oval frame of the standard, the ends tied below. A piece of rubber cloth is then laid over the sheet. A convenient and easily sterilized individual bath tub is thus provided for each infant. Or two wooden chairs can be placed with their seats together, facing each other, the legs tied together to prevent slipping. A sheet is then laid over the backs of the chairs and tied or held with safety-pins to form the bath tub, over which the sheet of rubber cloth is laid.

Stool Examination in Starch-fed Children.—KERLEY and CAMPBELL (N. Y. Med. Jour.). This study comprises the observations made by Kerley and Campbell on 57 children, 519 stool examinations having been made. Because of defective technic and errors in the early examinations, the findings in 27 children, comprising 353 examinations, are excluded. The report covers observations on 30 children, 166 examinations having been made. The stools were collected as follows: One-ounce tin ointment boxes, with the child's name pasted on the cover, were given the nurse in charge. A close watch was kept on the children, who were so grouped as to make this possible. As soon as an evacuation occurred a portion of the stool was placed in the tin box and sent to the laboratory. In order to make the test a severe one, raw barley flour was used, which was cooked one and one-half hours. In some cases barley water formed the milk diluent, in others it was given plain as the only nutriment. The method which they found the most reliable and which was used exclusively in the 30 cases was that known as the von Jaksch test. A considerable portion of the stool, a piece the size of a pea or larger, was placed in two drams of water, boiled and shaken, so as thoroughly to distintegrate the fecal particles. A few drops of Lugol's solution were then added and the solution was filtered and cooled. If starch was present, the characteristic blue color appeared. Filtration of the solution appeared to make but little difference as to the delicacy or reliability of the test. In the cases in which starch was not found, several portions of the stool were examined in order to make the examination a thorough one. In 16 children the examinations were persistently negative to starch. In five of these negative cases there was moderate diarrhea and in one severe diarrhea. The remaining eleven children showed sometimes positive, sometimes negative, sometimes red at the different examinations. Among the 30 children, 23 showed a good starch capacity. Of these, 11 had diarrhea, 7 showed poor starch capacity.

Budde Process for Preserving Milk.—HEWLETT (Lancet, Jan. 27, 1906). With a view to testing the efficiency of the Budde process for the preservation of milk, Hewlett conducted a series of experiments, from the results of which he draws the following conclusions:

1. All the non-sporing organisms, pathogenic and non-pathogenic, dealt with—viz., the Bacillus tuberculosis, the Bacillus diphtheriae, the Bacillus acidi lactici, the Bacillus typhosus, the Bacillus coli communis, the Bacillus dysenteriae, a paratyphoid bacillus, the Micrococcus pyogenes aureus and the cholera spirillum—are destroyed by the process.
2. Sporing forms—viz., the Bacillus anthracis, the Penicillium glaucum, the Bacillus subtilis, and the Bacillus mycoides—are not destroyed by the process although reduced in numbers, the inference being that the vegetative forms are destroyed but the spores are not destroyed.
3. Although the heating per se may be efficient in destroying certain non-sporing organisms—e. g., the Bacillus diphtheriae, the Bacillus typhosus, and the cholera spirillum—it is not so in all cases. Thus in one experiment the Bacillus typhosus and the Micrococcus pyogenes aureus survived the heating when no peroxid was added, and under similar conditions the Bacillus acidi lactici survived in the two experiments in which this was tested.

4. The same fact is strikingly shown by the effect of "Buddeising" on the natural milk—i. e., the milk without added micro-organisms. The reduction in numbers effected by heating alone is far less than with "Buddeising."

5. "Buddeised" milk is practically indistinguishable from untreated milk in taste, odor, appearance, and in the rising of the cream. No increase in acidity is caused by the treatment.

6. "Buddeised" milk will keep perfectly sweet and apparently unaltered in odor, taste, and appearance for at least from eight to ten days in hot weather and for a still longer period in cold weather.

7. In milk obtained in the ordinary way without special precaution the micro-organisms are reduced by the Budde process over 99.9 per cent. In the milk kept at room temperature the small residuum of living micro-organisms multiplies daily and ultimately (after from 12 to 14 days) may cause the milk to go bad.

8. The distribution of the "Buddeised" milk in closed bottles is in itself a great improvement on the routine system of distribution in open vessels.

9. The method excludes all possibility of adulteration of the milk by the vendor before it reaches the consumer.

10. Properly carried out, the whole of the added hydrogen peroxid is decomposed at the end of the process and no trace of it can be detected in the treated milk.

The principle of the Budde process is as follows: The milk is obtained in as cleanly a condition as possible, and if it has to be kept for any time before treatment it is efficiently chilled, but usually it is treated soon after milking. A proper proportion of peroxid of hydrogen is added to the milk and the mixture is heated to from 51 to 52 C. for at least three hours. A temperature below 48 C. is not efficient and one above 55 C. should be avoided as this tends to induce changes in the milk. With the aid of the heating the hydrogen peroxid is completely decomposed into water and oxygen by an enzyme (catalase) present in the milk, and the oxygen at the moment of liberation being in a nascent condition acts as an efficient germicide. At the end of the process the whole of the hydrogen peroxid should have been decomposed, provided the right proportion has been added, so that no antiseptic remains, a small but inappreciable addition of water has been made to the milk, and the majority of the micro-organisms have been destroyed. The amount of hydrogen peroxid required to obtain this result is about 15 c.c. of a 3 per cent. solution per liter of milk, so that the quantity of water added to the milk amounts to about 1.5 per cent., which, on a basis of 3 per cent.

of fat, would reduce the percentage of fat to 2.95 in the treated milk, a reduction in the percentage of fat of about 0.05, an amount which may be regarded as negligible. The milk is treated in bulk and immediately bottled with suitable precautions and supplied to the public in the bottles, a fact which alone should commend it. The milk so treated is practically unaltered in appearance and flavor, the cream rises as usual, all ordinary non-sporing pathogenic germs are destroyed, and the milk will keep sweet for at least eight or ten days in hot weather.

Treatment of Cerebrospinal Meningitis.—OSBORNE (N. Y. Med. Jour.). According to Osborne, the treatment of this affection consists in diminishing congestion, in taking means to prevent or to relieve cerebral or spinal pressure, and in combating all acute symptoms and complications as they occur. He says that the administration of diphtheria antitoxin in cerebrospinal meningitis is theoretically unsound and practically a failure. Spinal puncture is indicated when there is cerebral pressure, but he is in doubt as to whether or not it is indicated for diagnostic purposes, except in rare instances. The almost constantly beginning sore throat should be treated with antiseptic gargles and sprays, none better, he thinks, than the hydrogen peroxid solution. Conjunctivitis should be treated with simple boric acid solution. A calomel or saline purge should be given, and painful joints should be wrapped with cotton and kept warm. Pain should be stopped with morphine, by the mouth or hypodermically, depending on the intensity. If the pain is not severe and there is no vomiting, and if the pulse is good, bromids or chloral may be administered for the first two or three days. To quiet cerebral excitement and delirium, and to intensify the action of the morphin which must be given, Osborne believes that there is nothing that will compare with ergot, given intramuscularly or subcutaneously. The frequency of its administration should be about once in six hours, unless there is great cerebral excitement or the pulse is bad. The ice-cap to the head and the spinal ice-bag are necessary. If the temperature is subnormal or the surface of the body is cold, dry hot applications are of advantage. The general care of the patient should be the same as in typhoid. Osborne is convinced that ice, ergot and morphin will save many patients from death from this disease. Alcohol, strychnin and quinin are contraindications, although the first two are permissible in an emergency.

Congenital Dislocation of the Hip Joint.—THIENHAUS (Lancet Clinic, March 10, 1906). Thienhaus claims that congenital dislocation of the hip joint is perfectly curable in from 60 to 80 per cent. of all cases treated within the time limit by so-called bloodless or bloody methods. The best time for treatment is from the second to the fifth year. Patients over 8 years of age should only be subjected to a trial of reduction when examination has shown that the shortening of muscles, blood vessels and nerves is not so extensive as to make serious injuries inevitable, and that malposition exists between the head of the femur and the acetabulum. The bloodless methods of reduction should be tried first, and only after two or three attempts have been made without success or with bad functional results should the bloody methods be resorted to.

Inguinal Hernia in Boyhood.—Owen (The Practitioner, London, March, 1906). The operation performed by Owen is a good deal like that of Mitchell-Banks, except that Owen passes the sutures deeply through Poupart's ligament and the muscular inner wall of the inguinal canal so as to bring them and keep them in permanent contact. The stitches cause the deposit of a large amount of plastic exudation, which in due course becomes fibrous tissue and makes a splendid barrier.

Diabetic Coma in Children.—Dupuy (These de Paris). The author finds that diabetic coma in children sometimes has prodromes such as ethereal odor of the breath, weakness, change in character. Next may come gastro-intestinal troubles—dyspnea with decrease in amount of urine and presence of acetone in the urine. This period of attack is short and then the condition of coma is established. The patient loses consciousness or nearly does, breathes with great difficulty, reflexes of the cornea disappear, temperature drops lower and lower and soon he dies. Every time that coma appears in a child it is wise to think of diabetic coma and analyze the urine. Sometimes this is impossible because the secretion of urine has stopped, but nearly always there will be found traces of urine in the clothes, in a solution of which sugar will be found. The only treatment, and that only delays the fatal issue, is the intravenous injection of a 3 per cent. solution of bicarbonate of soda.

Measles Marked by Gastro-Enteritis.—Gillard (Medico-Chirurgicales du Centre). The author reports a remarkable epidemic. Diarrhea was profuse and extremely fetid, vomiting frequent and abundant. The general condition was bad, four cases being fatal out of twenty-five observed. The symptoms appeared generally on the second or third day of the eruption, but sometimes were delayed till the eighth or tenth day. Temperature usually was low and in one fatal case subnormal. Some of the cases resembled typhoid fever, one cholera and six had broncho-pneumonia as well.

Nervous Complications of Typhoid in Children.—ALLARIA (Gazz. dogli. Ospedal) reports 2 cases of meningitic symptoms, aphasia and right spastic hemiplegia following typhoid in children of 6. Both soon recovered completely. In a third case, in a child of 8, bronchopneumonia followed typhoid, and this was followed by fatal meningo-typhoid. In the fourth case the typhoid and pneumonia were followed by tetany and recovery. The meningitic symptoms improved in the second case after lumbar puncture, but this did not prevent the focus symptoms from developing. Allaria's experience confirms the observation of others that when an epidemic of cerebrospinal meningitis is prevailing, typhoid in children is more liable to assume the meningitic type.

Pathologic Anatomy of Congenital Deafmutism.—LINDT (Deut. Arch. f. Klin. Med.). Lindt had opportunity to examine the petrous portion of the temporal bone in a young woman who had been a deaf mute from infancy. The external and middle ear was normal, but both labyrinths showed anomalies evidently of embryonal origin, atrophy of the spiral ganglion, cochlear nerve, and ramus saccularis, with entire absence of the papilla basilaris on both sides, and with marked aplasia of the Corti organ and other findings similar to those of the 10 similar cases that have been examined histologically. The article is illustrated.

Clean Milk.—ROBY (Journal A. M. A., May 12) demonstrates from the experience of the Rochester health authorities that a remarkably clean milk can be secured without an expensive plant, and points out the way. The essentials are: First, the protection of the milk from any possible infection by disease, such as scarlet fever, diphtheria or typhoid. Second, cooling the milk and keeping it cold, or at least below 50 degrees. Third, keeping the utensils clean, or, better, sterile. Fourth, milking directly through sterile cheese cloth into a pail with a small (five-inch) opening. Fifth, keeping the milk tightly covered. These five points are absolutely necessary. Unless they are followed, milk with a low bacterial content can not be produced. With the following also carried out the proportion can be still further reduced so that in well-equipped and managed dairies it can be kept at 1,000 or below. Sixth, discarding the first-draws from every test. Seventh, keeping the cow absolutely clean. Eighth, keeping the milker's hands and clothes clean. Ninth, keeping the ceiling clean and free from dust; preferably it should be lathed and plastered. Tenth, keeping the barn clean and using shavings instead of straw for bedding. Eleventh, being careful not to stir up the dust before milking. He suggests that cities have a municipal sterilizing plant where the cans and cloth strainers can be sterilized and thence, with everything in place ready for milking directly into the can, sent out to the farms. After they are filled, all the farmer would have to do would be to seal the can after removing the strainer, put it into an icewater trough, and then send the whole outfit back to the city, where the milk can be bottled or delivered directly. This plan was tested, and bacteriologic examination showed a milk with less than 500 bacteria.

Unusual Case of Typhoid Fever in an Infant.—DORAN (Amer. Med.). The author says, I desire to place on record an unusual case of typhoid fever in an infant of 4 months. All calls were made at about 10 A. M. except when otherwise marked. The baby weighed 12 pounds at birth and was the sixth child. The mother suffered from great quantities of gas in the stomach and bowels while she was carrying the child. The baby has not been very rugged since birth. October 12 the baby was taken to Orland, Ind. While there a case of so-called typhomalaria developed in the same house where the baby was staying. The author was called on October 27, 1905, and found the baby crying and apparently in great distress. The bowels were loose and the baby would rest for a short time after each movement of the bowels; the stools were dark green in color and contained undigested milk. Temperature in axilla 103 degrees; feet and hands were cold. Baby's age 3 months, 9 days. October 29, temperature was 104 degrees and the bowels moved 3 times; less pain was present. October 30, temperature 103 degrees, bowels moved 2 times. October 31, temperature 103 degrees, bowels moved 2 times; small macules appeared on the abdomen. November 1, temperature 102.5 degrees; macules all over the body. November 2, temperature 102 degrees; child inclined to play a little, stools still greenish and containing undigested milk. November 3, temperature 103 degrees; child irritable. November 4, temperature 104 degrees; eruption fading, right hand twitching; in the evening the condition was about the same. November 5, temperature 104.6 degrees; right hand moving almost constantly. Afternoon temperature 106 degrees; right hand continually moving, pupils widely dilated, head thrown from side to side; child almost in stupor, from which it would wake with sharp cry; no movement of bowels. November 6, temperature 103.2 degrees; the same symptoms continued until the bowels moved, after which an improvement was noticed. Afternoon temperature 104.5 degrees. On November 7 temperature was 102.4 degrees, and the child was much better. After this date the temperature gradually went down to normal, and there was a steady improvement, recovery being very rapid. A test made on November 20 gave a positive reaction. The mother has never had typhoid. During the entire period of the illness the baby was nursed from the mother's breast. The temperature was always taken in the axilla.

Sarcoma in Vagina in Childhood.—Rollin (Revue de Gynécologie). Rollin gives summaries of 12 cases of sarcoma developing in the vagina of girls under 8. In some the tumor was noticed soon after birth. The first symptom was generally bleeding from the vagina, but sometimes there were pains and disturbances in urination and defecation, and occasionally the protrusion of the tumor was the first manifestation of its existence. The course of these tumors in children is essentially rapid. Death is soon entailed by the local extension of the tumor and the resulting cachexia. Metastases at a distance are rare. The duration varies from one to eighteen months. The prognosis is grave, as the diagnosis is generally not made until too late for relief from operative measures. Recurrence is the rule, and with exception of Schuchardt's and Hollaender's successful cases, the children soon succumbed to recurrence. Tumors in the vagina in childhood are almost always sarcomas. Any symptoms calling attention to the genital sphere in children should be regarded with suspicion. Physical examination is the only means of detecting the neoplasm. In children the sarcoma usually develops as a solitary bunch at first, assuming the bunch-of-grapes form later. The structure of the peripheral portions may differ from that of the base of the tumor. It may be mistaken for a harmless growth on this account.

The Leucocyte Formula in Pertussis.—Churchill (Journal A. M. A., May 19), has studied the lymphocyte increase in whooping cough and reviews its literature. In 36 cases, leucocytosis existed in all but one. Differential counts showed a lymphocytosis in 30, and in 15 out of 16 patients examined in the catarrhal stage. The significance of a high percentage of lymphocytes is of course greater as the child advances in years. His conclusions are as follows: "1. A general leucocytosis is present in almost all cases of whooping cough. 2. A lymphocytosis, i. e., an increase in the number of lymphocytes is found in about 85 per cent. of cases at some time during the course of the disease. 3. A lymphocytosis is found even more constantly during the early or catarrhal stage, over 90 per cent. showing the phenomenon at this time. 4. A lymphocytosis is found usually in those conditions difficult to distinguish from whooping cough. 5. The presence of a lymphocytosis in a child with a hard persistent cough is a factor of great diagnostic value. It is also of prophylactic importance, inasmuch as it can be utilized to prevent the spread of the disease by leading to the prompt isolation of the patient. 6. The child's age must be taken into account in estimating the importance of the lymphocyte percentage."

Infantile Scurvy.—Coutts (St. Louis Medical Review, March 24, 1906). Two cases of infantile scurvy complicated by extensive sub-periosteal hemorrhages are reported by Coutts. The first patient was aged eight months. The lower end of the right femur was thickened and the swelling was evidently painful to touch. There were no cutaneous hemorrhages and no history suggestive of hemorrhage into any of the viscera. The patient died. Surrounding the femur, almost its entire length, was a layer of bone formed in the detached periosteum, the space between the bone and periosteum being filled by a blood clot. In the case of the second patient both thighs were swollen and tense and there was evidence of subperiosteal hemorrhages in both the legs and the arms. Both the lower and upper epiphyses of the femora were detached, and each shaft lay free in a cavity formed by blood clot and blood-soddened muscles. Instead of bone having formed in the detached periosteum that membrane had undergone a process of necrosis and no trace of it was discoverable in either limb.

The Pediatric Outlook.—In the chairman's address before the section on Diseases of Children at the recent meeting of the American Medical Association, Dr. W. C. Hollopeter, Philadelphia (Journal A. M. A., August 11), offers congratulations on the remarkable progress made in this specialty. Diphtheria has been robbed of its terrors, epidemics of scarlet fever and measles, which twenty years ago were looked on as inevitable calamities, are now considered as a reproach to the community permitting them, and infant mortality from artificial feeding has been largely checked by increased knowledge of food modification, percentage feeding and accurate adjustment of food to the individual child. With the elementary work in pediatry thus well done, we find ourselves facing new problems, and at every step shoulder to shoulder with the workers in general sociology. One of the future problems is that of the better education of mothers, another is the better municipal management of health matters by the public authorities, health protective laws for children, clean milk supplies, school inspection, etc. The enormous possibilities in the proper education and development of defectives are also mentioned, and we should have at least, he states, a judicial comprehension of the possibilities of the new science of eugenics, though society may not yet be fully prepared for their realization.

Hot Weather Feeding of Infants.—G. R. Pisek (Journal A. M. A., August 11). The author calls attention to the importance of the proper excretion of heat to infant health and how it is affected by diet, atmospheric humidity etc. The temperature of the air, therefore, is not a safe guide to follow in judging summer conditions and the causes of digestive disturbances in infants. The need of care to prevent food infection still further complicating the conditions is also pointed out. He sums up his conclusions, in substance, as follows: 1. In warm weather keep a light woolen garment over the abdomen to prevent sudden chilling and retention of heat by suppression of perspiration. 2. Bathe the child twice daily to remove salts and fats on the skin that are left by the sweat and tend to retard the evaporation and to embarrass the excretion of heat. 3. Give plenty of cool boiled water to drink, thus replacing that lost by perspiration. 4. Pasteurize all food of well infants to retard decomposition. 5. In close or muggy weather, or if the humidity is high, dilute the food to one-half with boiled water. In very mild weather, with high temperature, stop milk and feed with gruels till the humid spell is over. 6. On warm, humid nights stop milk feeding, as the humidity is greater at night, though the temperature may be lower. Feed gruels or whey, which produce little heat. 7. For diarrhea, give castor oil or calomel to eliminate decomposing food. Stop milk feeding temporarily. If the air is hot but dry, milk may be resumed. With high humidity, feed gruels or whey to starve out putrefactive bacteria and get back to milk very cautiously. 8. Keep up a good air circulation, as stagnant air soon becomes saturated, thus preventing perspiration and heat absorption.

Congenital Tuberculosis.—Friedmann (Virchow's Archiv., clxxxi., No. 1) relates the results of two years' experimental research with the aid of the Bose endowment. It was noted that week-old embryos of rabbits almost invariably contained tubercle bacilli when such bacilli had been injected into the vas deferens of the parent rabbit a few weeks before coupling. If the coupling took place after an interval of more than four weeks, conception did not follow. When animals had been infected by way of the lungs, and the process had passed into a latent stage, no tubercle bacilli could be discovered in the embryos and they developed into healthy animals. Infection by way of the peritoneum became generalized so quickly that conception seldom followed coupling. A few tubercle bacilli could always be found in week-old embryos when, immediately after coupling, tubercle bacilli had been injected into the mother rabbit's vagina. Intraperitoneal and intravenous infection always prevented conception later when the infectious process was in progress. Subcutaneous infection of the mother animal immediately preceding coupling generally resulted in the finding of isolated tubercle bacilli in the liver of the fetus. They had evidently passed through the placenta. They always proved to be a virulent, and the embryos developed into healthy animals. Examination of sections of six pairs of testicles from cadavers of consumptives failed to reveal tubercle bacilli in any quantity. Only two bacilli were found. Similar sections of testicles from lepers showed swarms of lepra bacilli in the sections of the testicles. Friedmann adds that in 983 tuberculous patients with a parental history the father had been tuberculous in 51.2 per cent., the mother in 32.8 per cent. and both parents in 15.9 per cent., showing the preponderance of paternal tuberculous records. In all his experiments the embryos, although harboring tubercle bacilli, yet developed normally and were not to be distinguished from normal animals.

Arteriosclerosis in Children.—Oppenheimer (Virchow's Archiv., clxxxi., 1). Oppenheimer reports two cases of arteriosclerosis in boys of 9 and 10. In the first the child succumbed to a spontaneous rupture of the aorta. High blood pressure and a possible congenital weakness of the wall of the artery were the cause of the affection in the first boy, but in the second it was undoubtedly of toxic origin. The pathologic anatomic findings in each case were those of typical arteriosclerosis.

The Serum Treatment of Cerebrospinal Meningitis.—S. Flexner (Journal A. M. A., August 25). The author has studied the exudates from sporadic cases of cerebrospinal meningitis in the Rockefeller Institute and noticed the peculiarities of the diplococcus intracellularis and its toxin, experimenting chiefly on small guinea-pigs. He also experimented on monkeys to reproduce the lesions and symptoms of cerebrospinal meningitis in man, introducing the cultures into the spinal canal by lumbar puncture, and found that the lower monkeys could be infected without great difficulty with the diplococcus, reproducing the pathologic conditions and symptoms of epidemic cerebrospinal meningitis. The cocci thus injected distributed themselves in a few hours, producing a meningitis and an exudate accumulating chiefly in the spinal meninges and the basal meninges of the brain. The uniformity of the exudate in this latter location and the rarity of its appearance in any amount over the convexity led him to doubt the validity of the reasoning which ascribed this localization in man to the entrance of this infection through the nasal membranes. Although the lesions and conditions are comparable with those in man the susceptibility of the monkey seems to be much less and a much larger dose per kilogram is required than what is probably effective in human infection. The proliferation of the cocci also is comparatively small in monkeys. Flexner also experimented with antisera prepared in rabbits, goats and large monkeys. If the experimental disease in the monkey could be checked by the lumbar inoculation of such antisera without later ill effects the possibility of a serum treatment in man is also suggested. The details of the experiments are given both on guinea-pigs and monkeys; goat serum being used and control animals being also observed in each case. In a series of five large monkeys the results of the antiserum inoculations were fairly successful in four, but one altogether unexpected failure occurred. In guinea-pigs infected by peritoneal inoculation the goat serum was protective with simultaneous injection of 1 c.c. of antiserum and also as a therapeutic application when given intraperitoneally two and four hours, respectively, after the inoculation. Subcutaneous injection several hours after infection failed to protect, even with larger doses of the antiserum. He does not yet consider it safe to predict how far the results obtained with monkeys are applicable to the treatment of cerebrospinal meningitis in man, but further experiments may develop something of value. If it were practicable to employ monkeys to produce the antisera to be used in man, the danger of serum intoxication might be lessened while the good effects of the immunity principle might be retained. At present he does not think the injection of alien sera into the human spinal canal should be undertaken until their physiologic action has been worked out in more detail on monkeys. It is his intention to continue the studies already begun along these lines.

Infantile Palsy of Spinal Origin.—ROBBINS (N. Y. Med. Jour., Mar. 10, 1906). In the case reported, forceps, fillet, hand or pelvis did not form etiologic factors. A drooping of the right arm was noticed immediately after the birth of the infant. There was never the slightest evidence of voluntary control of the right arm. There was no evidence of cerebral implication. For experimental rather than for therapeutic purposes, the infant was stretched out at full length on the bed, its arms placed above its head, the middle fingers touching. A pull at his feet brought both arms down at once, flexed in the attitude of defense on the chest, both being flexed at the elbow, and then extended to drop along the body. This experiment was repeated several times and invariably yielded the same result. Robbins thinks it remarkable that exactly that position in which the greatest amount of tension is brought to bear on the fifth and sixth cervical vertebræ should have resulted in a temporary restitution of conductivity in the musculo-cutaneous nerve. He suggests that possibly the cervical roots of this nerve have only been stretched at their point of emergence from the spine.

Buttermilk as an Infant Food.—Ramsey (St. Paul Medical Journal, March, 1906). The writer's attention was directed to the value of buttermilk in Baginsky's clinic in Berlin. He has employed it in about 30 cases, partly in hospital and partly in private practice. He has varied Baginsky's directions, diluting the buttermilk according to the conditions present in a given case. In a few cases in which there was marked colitis the buttermilk caused constipation. This, however, was only temporary. When the condition of the infant improves and the stomach becomes more tolerant, cream may be added with advantage. The length of time children may be kept on buttermilk varies. In two cases the writer has given it for seven months, each case doing badly on any attempt to return to ordinary modified milk. Both of these cases are above the average in development. Although they have been watched carefully no symptoms of rickets or other nutritional disturbance have been noted. In using buttermilk it is most important that it should be fresh. Buttermilk secured from creamries where they churn daily and where the cream is soured to a specific degree is wholesome, providing it is fresh. As soon as the buttermilk is secured, if it is boiled and placed on ice it may be kept for two days. Where fresh buttermilk cannot be procured from the shops cream may be purchased from the dairy and churned at home. Buttermilk is not only of use in the treatment of sick children, but is an excellent food for well babies. A baby may be taken from the breast when the milk disagrees and placed on buttermilk, when it will gain in weight from the first day. The lactic acid in buttermilk has bactericidal properties. It has been shown that tubercle bacilli will not live to exceed two days in buttermilk which has not been boiled.

PEDIATRICS

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ORIGINAL ARTICLES

ON CHRONIC APPENDICITIS AND THE EARLY DIAGNOSIS AND TREATMENT OF ACUTE APPENDICITIS IN CHILDREN*

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Some authors think that the frequency of appendicitis in childhood does not depend upon a true predisposition, the children being the most numerous among the population, the same proportion of cases for a disease whose real frequency is not modified by age must give a larger number in the young. But that alone is not sufficient to explain such a predominant number of cases as we meet with in Paris, where, as soon as appendicitis began to be narrowly studied, important statistics appeared from our two children's hospitals, observed by our regretted Dr. Brun, by Jalaguier and by myself. I will recall the fact that in 1896 one of my pupils, Miss Gordon, made her inaugural dissertation from my first seventy-nine observations on appendicitis in children, and since then I have operated more and more on patients under fifteen years of age suffering from appendicitis, partly because we have learned to diagnose some cases formerly unknown, and also, it seems to me, because we have had periods of increase, due to the frequent return of influenza to which we have unfortunately been accustomed since 1890.

But if, as I believe, the frequency in childhood is greater in Paris than in London, I do not think that influenza is the true cause of that difference, for influenza has now invaded all countries. If there is a particular cause, my opinion is that it must be sought in the food.

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*Brit. Jl. Chn's Dis.

In spite of some opponents, every day lessening, it is forcibly asserted nowadays that appendicitis is but the consequence, the localization, of an entero-colitis previously more extended. This localization gets its surgical importance on account of the special anatomical connections between the peritoneum and the appendix, predisposed by its structure to lymphangitic inflammation, even to perforation. But it also seems that all cases of enteritis have not the same tendency to create appendicitis.

Every one of us knows well how frequent is gastro-enteritis among babies not suckled, and who, suffering from diarrhea or constipation, insufficiently fed or overfed, end, according to the cases, in athrepsia, summer diarrhea or rickets. It is a fact, nevertheless, that appendicitis is almost never seen in new-born babies. The youngest on whom I have operated was 1 year and 8 months old, and such an age is very exceptional.

One of the causes of this apparent rarity in infancy is, no doubt, the serious clinical difficulties we have to deal with. We are bound, with very young children, to practice an examination almost veterinary, on patients unable to give us any information, unless by screams when we rouse pain by palpation. So the chronic forms, of which I shall speak to you by-and-by, escape us, and with them no doubt a great number of acute ones. But the fact remains that our medical colleagues, in their post-mortem examinations of nurslings dead from gastro-enteritis, never mention peritonitis of appendicular origin in children under two years of age; they do not even describe the appendix and peri-appendix lesions whose importance we know well in older patients.

This is partly owing to the fact that appendicitis takes a certain time for its formation and for its surgical individuality after the beginning of the causal enteritis; and I think that a few children attacked with appendicitis suffer from food badly digested in infancy. However, I do not believe this to be a rule, and by the observations made at every age and in every country, it appears that the general medical opinion is that an excess of flesh diet may be the origin of enteritis predisposing to appendicitis.

But if the English people, men of the north, eat a great quantity of meat when grown up, they are in the habit of giving but little of it to their children during their first years of life—sometimes, perhaps, not even enough, if I may judge by what our French mothers call bringing up children "à l'Anglaise."

Among the predisposing forms of enteritis is one whose frequency has increased, during the last years, in childhood and in adults; it is muco-membranous enteritis. I insist upon it, for some persons have found a certain antagonism between that illness and appendicitis; but I think their view is precisely the opposite to the reality.

This point presents a double interest: (1) for the diagnosis; (2) for the treatment.

It is important from the point of view of diagnosis, for I have seen children die, and others almost dead, from repeated and unrecognized attacks of appendicitis, because appendicitis in their case was associated with evident attacks of muco-membranous enteritis; and those children's physicians, although learned and most distinguished doctors, have sorrowfully learnt how wrong was the mischievous doctrine of antagonism.

It is quite as important for the treatment, for it often happens that we are obliged to submit our patients to medical and dietetic treatment for enteritis after their appendices have been removed. I know well that in every case of muco-membranous entero-colitis there exists an important nervous element. Some of them are positively reflex and disappear with surprising rapidity after the surgical cure of abdominal disease—renal, utero-ovarian, etc. This may happen after the excision of a chronically irritated appendix; chiefly we have often observed to disappear, after its removal, old and intense constipation, due to intestinal atony, from which many patients suffer before the operation. We do not obtain the same results in muco-membranous diarrhea, and I am compelled to record the cases of patients who suffered from more or less serious relapses after the operation for appendicitis.

By clinical observation it is not always possible to determine with what certainty an operation would cure intestinal disorders; but if any time before the operation these symptoms are intense and prolonged, it will be prudent after the surgical procedure to recommend for some months a careful medical treatment.

I said that, when enteritis exists, appendicitis takes some time to develop; and I add that most often this process is a chronic one. Formerly we did not think so; for, struck by the acuteness of the attack, we have not always inquired into the antecedents of our patients for the indications of a former and chronic lesion; but we were not long before realizing that those symptoms existed, and almost all of us now regard appendicitis as a chronic alteration, aggravated by acute episodes. This notion has become common nowadays, but it was less so seven years ago, when I drew attention to it in a monograph on appendicitis. If one is to study successfully all that concerns the diagnosis and the treatment, it is important to separate carefully the two states I have just mentioned, chronic and acute appendicitis.

In order to explain things more clearly, it is now classical to establish a comparison between appendicitis and inflammation of the throat; for we know that the initial lesion of the appendix, which has an exceedingly well developed lymphatic tissue, is a chronic folliculitis, comparable to that of enlarged tonsils and adenoid growths; we know also that acute inflammation of the appendix varies from a simple hemorrhagic spot of folliculitis to the gravest gangrenous lymphangitis, states which may be compared with more or less violent attacks of acute tonsilitis or adenoiditis. And, going farther in the comparison, I am one of those who assert that if, in cases of this kind, the appropriate treatment is surgical, in acute attacks it is prudent, although for other reasons, to let the inflammatory mischief subside before using the knife.

My first care will be now to explain by what symptoms chronic appendicitis reveals itself to us, and what are its diagnostic signs.

It not infrequently happens that during post-mortem examinations, or during various laparotomies, we find evident lesions of the appendix on patients who had never been suspected of appendicitis. But perhaps these cases, whose local symptomatology is really *nil,* would not be so wanting in symptoms as they appear to be if we attributed their dyspeptic attacks to their true cause—that is to say, to chronic appendicitis.

In its common form appendix dyspepsia is marked firstly by gastro-intestinal atony, the abdomen being frequently flatulent, by difficulty in digestion, by eructations and often by obstinate constipation, interrupted sometimes by diarrheal discharges, which may be caused by a particular kind of food, especially by butcher's meat, fats and indigestible articles of diet. I have known some patients of mine who could not bear even milk and eggs, and whom I was obliged to feed with vegetables only.

These patients have, as a rule, a coated tongue, offensive breath, and even a subicteric, grayish complexion, a capricious appetite and habitual nausea. It is not rare for them to suffer also from gastralgia or stomach-ache, coming on without known cause, and in very variable frequency, intensity and duration. The patient feels a sudden but keen though not well localized abdominal pain, associated with an unexpected pallor and even a fainting sensation. It is easily understood, then, that in certain serious but exceptional cases the growth of children may be stopped by such digestive disorders, and a real cachexy be established. Certain patients who have attended their doctors during years for obstinate dyspepsia, even for supposed intestinal and peritoneal tuberculosis, or, in adults, for supposed intestinal or stomachic carcinoma, were really suffering from chronic appendicitis.

However latent the local symptomatology of appendicitis may be, it is a rule that a weight, an indefinite pain, or at least an uneasiness draws attention to the right iliac fossa, and we feel by careful palpation, under a normally depressible abdominal wall, the cecum a little thickened, and without flexibility, distended with gas and gurgling, and sometimes also a small tumor rolls under the fingers, due either to the appendix itself or to enlarged lymphatic glands, although nothing enables us to determine this point with certainty.

By deep palpation, specially on McBurney's point, a slight pain is awakened, which one is made aware of either by the patient's testimony or by a small defensive contracture of the muscles of the abdominal wall. These local signs suggest to us the ileo-cecal origin of the abdominal disturbance; they exclude, for instance, the idea of nephritic or hepatic colic, but they may lead to error, for they may be the signs of a commencing tuberculous disease of the cecum and not of appendicitis. We must bear in mind this rare tuberculous lesion, puzzling as to its diagnosis, because it may commence with an acute attack, and even by an iliac abscess. Once I was thus mistaken, when I thought to operate on a simple appendicitis after subsidence of the acute attack; on a second occasion I saw another surgeon's patient, for whom he had opened an acute abscess which remained fistulous. I must admit that I cannot give precise directions for its diagnosis—at least, in those cases where nothing else of a tuberculous nature exists either in the abdomen or elsewhere, even when cecal infiltration is advanced.

Until now I have spoken of a symptomatology which is always obscure. There are more marked cases manifested by special and paroxysmal phenomena, among which vomiting in a variety of forms seems to hold the first rank.

We may observe, firstly, children who have in the morning only frequent gastric vomiting, rarely bilious, and without any fever. In certain cases the vomiting becomes habitual, and to such an extent as to be a grave hindrance to feeding. I remember some children relatively young—between three and five years of age—who, after an attack whose acuteness and form was very variable, remained unable to bear any other food than vegetable broth.

Sometimes there are very different symptoms, which occasion real difficulties of diagnosis. I remember a girl who suffered from obstinate constipation, headache, and retraction of her abdomen "en bateau," so that one of my colleagues diagnosed tubercular meningitis. Another patient, a boy, on the other hand, was constipated, with pronounced meteorism, and another patient had a very acute intestinal obstruction, with complete stoppage of gas and fecal vomiting, without fever. However, the last had only a paralytic reflex obstruction, and two hours after the opiates employed provoked the emission of gas and the end of every symptom. These patients recovered after removal of the appendix.

In the main, these cases constitute a series of examples where the symptoms of dyspepsia with gastro-intestinal flatulence are exaggerated, either continually or by sudden attacks. The study of the temperature and the pulse prove that infectious phenomena are nearly *nil.* In fact, when we operate we find sometimes some old peritoneal adhesions; most often we find none, and the appearances are those of simple chronic appendicitis. One can only see on the mucous membrane the hemorrhagic staining of one or two points of folliculitis.

In another series the infectious element becomes more important, and a very frequent clinical form is the one where, although the initial dyspepsia may be very light, or even absent, there suddenly breaks out every sign of an "embarras gastrique febrile;" sometimes after too plentiful a meal, sometimes without any appreciable cause, the child has indigestion, with vomiting, and very quickly the fever runs up to 39° or 40° C. The tongue becomes coated, the breath has a sour smell. At the same time there is abdominal pain, which is localized either around the navel or in the right iliac fossa, and in palpating this latter region you find some pain at McBurney's point, a slight muscular resistance, but no trace of phlegmonous infiltration.

These last objective signs allow us to establish a precise diagnosis if one is called at the very moment of this slight attack, and thus we have learnt the great clinical value of "embarras gastriques" irregularly repeated in the previous history of patients suspected or duly convicted of chronic appendictis. Beware of those frequent indigestions, which mothers treat with a dose of medicine, when with the sickness are associated sudden fever, and colic principally on the right side.

These attacks, even when not attended to, do not last more than one or two days. But in some cases they grow worse and more frequent, so as to present the classical appearances of the periodical acetonemic vomitings of childhood. I have pointed out facts of that sort and spoken of children attended during several years for such a disease by eminent doctors, and cured only by the removal of their chronically inflamed appendices, and I said that for a patient of that kind it was very important to pay serious attention to the spontaneous pain, or to the one excited by pressure over the right iliac fossa. I said also that for those patients it was necessary to search for the physical signs of chronic appendicitis, such as I have just described them. We shall acquire in thus doing the elements of a sure diagnosis which is sometimes neglected. But I have not said or thought anything more on this aspect of the case, and I have been very surprised to read in some recent papers on the matter that I always considered periodical acetonemic vomitings as a form of appendicitis.

When these patients are operated upon, it will be found that appendix or periappendix inflammations are, in the average, more intense than in those of the first series, which have only dyspepsia with apyrexia or little pyrexia. And here, with the ordinary folliculitis associated with an old sclerosis, we find sometimes omental adhesions; but one may say that, with some exceptions, these changes are not worthy of immediate surgical interference, however alarming may be the symptoms. The impression produced in these cases, however paradoxical the assertion may sound, is that of an acute attack associated with chronic pathological changes, and certainly in these cases post-mortem examination will never cause the surgeon to repent of not having operated rapidly enough to anticipate the infection. Besides, if we examine thoroughly these patients' pulse, temperature, functional indications of general or peritoneal infection; if we ascertain, at the same time, the depressibility of the ileo-cecal region under palpation, we do not find in these signs cause for an immediate operation.

However, I shall not assert that the surgeon is never to interfere in these cases. Rather, on the other hand, I think that it is to the surgeon only that these patients should go, and it is convenient here to state the opinion I shall soon fight for in another sense—"that there is no medical treatment of appendicitis." I admit that patients who suffer from chronic appendicitis and enjoy uninterrupted rest and a most exclusively vegetable diet may, if not cured, have no acute crisis, nothing save some insignificant uneasiness.

But if that rest can be obtained for grown-up patients, exception being made for the working class, it is impossible to obtain it for children, especially in the case of boys, in whom severe exercise, fatigue, a visit to the "tuck-shop"—and often some unknown cause—may readily incite grave attacks by which life is suddenly threatened from peritoneal or even general infection. And then is to be considered the grave question: Must the surgeon operate during the acute crisis?

In order to take, I don't say an absolute and final, but a reasonable step, we must first consider the dangers we have to deal with.

When an acute attack occurs in an appendix, chronically irritated or not beforehand, the initial lesion seems to be the same as I have described previously—that is to say, a more or less intense, more or less limited, folliculitis. But from it may result a real lymphangitis, grave and diffuse, simple or gangrenous, perforating or not. Then intervene in the highest degree the phenomena which had remained at the second stage in the preceding forms—general infection, peritonitis.

General infection seems to be conveyed especially through the veins. The origin of some cases of pyemia with predominant hepatic abscesses is without doubt a pylephlebitis starting from the vermiform appendix. In other cases there is a true septicemia without any suppuration of the liver, which, however, undergoes an extraordinarily rapid fatty degeneration; and it must be noticed that, if the appendix is generally found gangrenous in these conditions, that alteration is not indispensable. Lesions are found which are sometimes so insignificant that after operation we have some reason to think that in reality we are dealing with a septicemia originally intestinal, where the appendix is certainly infected to a certain degree, but is involved only for a part, and even then for a very small part.

These forms, which are not very well known to us yet, are anatomically and clinically very different from those in which complications special to appendicitis depend upon the particular anatomical connections between the appendix and peritoneum.

These two principal forms are to be considered according as the peritoneal inflammation is or is not circumscribed by adhesions, for the diffuse peritonitis, more or less septic, and the encysted peritonitis, ending by a localized abscess, are evidently of very different prognosis.

The gravity of these general or local infecting conditions is extremely variable. They stand between the slight attack with very sudden, and transient, high fever, and those in which death occurs in two or three days. And it is easy to understand that these catastrophes haunt our memory; the more because, we must avow it, the beginning of the illness does not always allow us to diagnose with precision what will be its ulterior evolution.

Hence arose the tempting, because simple opinion, that the surgeon must always operate in acute appendicitis as soon as he is called to give his advice. Twelve years ago it was the opinion of almost all surgeons. I don't deny to have shared it, and I am convinced that in acting as we did at the beginning of our practice, we saved numberless lives. It was at a time when our surgical activity was checked by numerous physicians, staunch defenders of medical therapeutics. When we analyzed the results, the average of various operators' statistics, we had a mortality of about 25 per cent., and in spite of some medical statistics published at the time, I am persuaded that our success was infinitely superior to that of our opponents. As they have become less and less numerous, it is useless to refute them now.

However, their assertions were partly true sometimes. Very often, after refusing our counsel for immediate operation, they obtained the resolution of what was formerly called perityphlitis and which is now named appendicitis; and, on our part, we became aware that, for patients who had their attack calmed by medical treatment, the operation made in the interval of attacks, "à froid," as we say in France, was very much better. It allows us to remove with ease the appendix, whch is not always possible among the adhesions of an encysted peritoneal abscess. It almost always enables us to obtain primary union after careful suture, and so we avoid the hernia which is so frequent after the incision of an abscess. And it not only saves the patients from these two causes of a second operation, more or less delayed, but further reduces the mortality to 10 per cent. instead of 25 per cent. in the hands of the same surgeons. We set aside, of course, the operation for chronic appendicitis in which the mortality is almost *nil*. I am speaking now specially of the acute cases that are brought to the hospital, including those we see for the first time when they are already suffering from diffuse peritonitis and almost hopeless. I insist on that point, because there is an important difference between private and hospital practice. In the acute attacks, with localized suppuration, we are liable to inoculate with the pus the adjacent peritoneum not protected by adhesions. Then follows a fatal peritonitis, and now we know that a too early operation was the cause of this diffusion.

So a general understanding was arrived at, or nearly so, between the fellows of our Parisian Surgical Society and the debate which took place in 1903 proved that almost all our colleagues, renouncing the rule they had adopted in 1899, had given up the practice of always operating immediately. They think now, and it has been my opinion since 1896, that the rule must be: operate immediately if you are called within the first twenty-four hours following the outburst of the acute attack; but when you are called afterward, you must act according to the indications given by each indivdual case, and then with the idea of calming as much as possible the attack before operating.

It is certain that the early operations, in the first twenty-four hours, before perforation or gangrene, before adhesions and suppuration, can be performed in anatomical conditions almost identical with those of the operation "à froid," and nearly all the objections previously mentioned are then of no account. But, in order to act in this way, we must possess an absolutely certain diagnosis; and in children this is difficult to obtain, in association with certain clinical features understood by all children's doctors and surgeons, and this is the reason why they came to a general agreement about that subject.

The causes of error exist both for peritoneal and septic forms. Suppose a child presents the symptoms of an acute peritonitis, it is often more difficult to decide quickly in him than in an adult whether the appendix is attacked. The tubo-ovarian inflammation conduces to error, without doubt, in women, but less than pneumococcic and gonococcic peritonitis in childhood; and we must remark that in a great majority of cases the pneumococcic form attacks girls, and that the gonococcic cases are exclusively confined to them. Diagnosis is generally easy when pain in the right iliac fossa is definite, localized, and acute, spontaneous or excited by pressure, and when in a few hours phlegmonous swelling with muscular defence of the abdominal wall is evident. But we must take care and be cautious when children say their abdominal pain is round the navel, and when the swelling is relatively slow in forming. Besides that, pain limited to pressure with muscular defence may also exist in other forms of peritonitis which I mentioned, for pneumococcic peritonitis is usually more or less encysted around the initial point, and the gonococcic starts from a tube, without, however, any tubo-ovarian tumor which could be found by rectal investigation, such as occurs in women.

In gonococcic peritonitis the appearance soon becomes very grave, with a very small and very weak and frequent pulse, with cyanosis of the face, and those obvious local symptoms which will attract your attention if the girl be suffering from vulvo-vaginitis. But at the commencement, save in the rather uncommon case of a previous pleuro-pneumonia, the nature of pneumococcic peritonitis escapes us entirely up to the moment when pus is collected in the abdomen. As a rule, immediate diagnosis is impossible. On the other hand, it is certain that the opening of the peritoneum aggravates in a disastrous way the virulence of the gonococcic infection; it aggravates just as much the pneumococcic one in an early stage, before the formation of pus. The first of these two forms of peritonitis will never become surgical; the second one will, but not in the initial stage. In fact, in both forms one may meet with serious complications if one tries the method of exploring laparotomy. On the other hand, laparotomy does not cause any injury in the beginning of tubercular peritonitis simulating the beginning of appendicitis.

Another difficulty arises in children when symptoms closely resembling those of appendicitis, without iliac swelling, but accompanied with sudden fever and vomiting, are due to intestinal helminthiasis. In some of them the symptoms cease after one or two days by the spontaneous evacuation of the ascarides. As early as 1893 I had one of these cases which was published by my pupil Jacob in his inaugural dissertation. These cases have been used to establish the theory of appendicitis provoked by intestinal worms; I believe that is a false one, but such facts must put us on our guard against operating when we are not able to make with precision an immediate diagnosis.

Certain septic conditions, without any peritoneal symptomatology, but with pain at McBurney's point, also give rise to mistakes. For instance, I see occasionally children who are supposed to be attacked with appendicitis, and who are suffering in reality from pneumonia with an abdominal stitch. This condition is easily diagnosed if the classic stethoscopical signs exist at the same time. But the perplexity is great in the case of a central pneumonia, where the signs become manifest only after two or three days. These cases are not rare enough in children to give us a right to neglect them. Similar conditions are met with in association with pleurisy.

Lastly one must bear in mind, still more, I believe, in children than in adults, the possibility of typhoid fever beginning suddenly, with vomiting, iliac pains and even enlargement of the cecum and its lymphatic glands. I observed two cases, particularly obscure, where typhoid fever began in this way, though I knew that they were undoubtedly suffering from a previous chronic appendicitis.

My personal opinion, and that of all my Parisian colleagues, children's physicians, and surgeons, is that these unavoidable difficulties in diagnosis do not permit us to adopt the rule (excellent in cases where the diagnosis is certain) of operating in every case within the first twenty-four hours. Again, we are ordinarily not called so soon; in small and slight attacks, which are by far the more common, mothers are accustomed to treat them as indigestion, and when the doctor is summoned some time has been already lost, and still more is wasted before the surgeon arrives.

The opinion which begins to prevail is the following: That when for one of the reasons stated, we have decided to wait, we must continue to do so, while studying from the moment we are summoned the clinical indications for an immediate, early, or postponed operation, in each particular case.

I think it useless to insist upon the clinical phenomena which requires, in diffuse peritoneal forms, immediate surgical interference. Disassociation between pulse and temperature, green vomiting, anuria, dryness of the tongue, alteration of the facial expression, suppression of gas through the anus, are all signs of diffused peritonitis, or of peritonitis near being diffused. We must exclude, however, patients brought to the hospital who present these symptoms after a wearying journey, and who appear much better after some hours' rest.

In these forms of diffuse peritonitis some surgeons, thinking the condition of the patient hopeless, decline to operate and allow him to die. I believe they are wrong, for now and then some patients judged hopeless have been cured by laparotomy. One might argue, perhaps, that peritonitis was not in such cases truly generalized. But the clinical fact remains that when the symptoms of generalized peritonitis exist, surgical cure is possible, though exceptional. We must then operate, without regard to keeping up brilliant statistics.

As to encysted peritoneal forms, they must be operated on immediately only if an abscess has collected; in that case immediate operation is followed by remarkable success, and we must not delay it if after the third or fourth day the fever persists and runs high, and if swelling is discovered in the iliac fossa or in the rectum.

Further, without agreeing with the few who advise waiting for fluctuation, we must understand one another about such cases. When in operating we find pus, we must not conclude that the operation could not have been postponed until the day after, as has been said by many observers. For instance, very often in operating a long time after the calmed attack we discover around an appendix sometimes calculous or even perforated remains of an abscess and caseous matter between the adhesions; surely in these cases there has existed pus which has been absorbed.

That being so, I have not been very surprised that, in spite of the scientific precision of a laboratory's investigation, the study ot leucocytosis of the blood has led several observers to contradictory conclusions. We have in this one more indication of value; but we have not in it the positive criterion desired by some surgeons, and we must be satisfied to place its diagnostic indications along with the whole of the physical and functional phenomena of which I am going to speak, in studying the cases in which we attempt to calm the attack. In doubtful cases it is unnecessary to say that we must operate more quickly, but we must inquire carefully how the medical treatment has been applied during the preceding days. In fact, we are sometimes astonished how rapidly this treatment, when well managed, acts on patients aggravated by the use of purgatives and by inappropriate feeding.

I consider it useless to give here particulars of what is meant by "medical treatment" in the acute attack. It may be recapitulated in few words: Complete deprivation of food, only a few spoonfuls of pure water, and large bags of ice on the abdomen. In former times I always prescribed opium; now I give it only when specially required, when colic is very painful and not explained by an increase of the iliac swelling. I must draw specially your attention to purgatives being dangerous and remark that patients who drink milk or broth do not keep strict diet.

Patients thus treated must be carefully watched so that they may be operated upon, not only when the slightest appearance of peritonitis is noticed, but also if the fever does not yield quickly and if the local swelling progresses.

From all this it results that we should delay less when there is pelvic localization of the swelling, a form difficult to watch, and of which the diagnosis is made by paying attention to some special clinical facts, such as vesical pain in passing water, and above all by searching systematically *per rectum* with the finger. We must also remember that we are not to act in the same manner with patients who live in town as with those who live in the country;

these latter require to be operated on almost always immediately.

According to all these preceding facts, there is no absolutely established rule. But an accomplished clinical man will but rarely allow himself to be surprised by the development of peritonitis during an attack of appendicitis with local swelling, in which he watches an abscess in formation. Disappointments will be less frequent than from diffuse peritonitis following an operation undertaken too late or from one performed too soon, after the beginning of a peri-appendicular abscess, and before the protecting adhesions have formed between the deeply seated pus and the anterior abdominal wall.

The real difficulties of diagnosis and the painful surprises for surgeons are not due to these encysted peritoneal forms, but to certain gangrenous appendices in which diffuse peritonitis, with green or even black vomiting (without doubt the final phenomena) occur, but in which, until that sudden and final outburst, peritoneal symptoms remain unheeded. The patient is dangerously infected, highly feverish, pale-faced, sometimes looking subicteric, with cyanotic lips, but in the abdomen we do not find clear signs. The initial iliac pain draws attention to the appendix, but I have not found it from the beginning specially intense. In handling the abdomen, we cannot detect any swelling and we cause often little pain; even the abdominal wall can be sometimes easily depressed on all parts when the appendix is in its normal place, and when it is hidden far away from our fingers, in such a region as the top of the pelvis or in the sacral fossa, the absence of physical signs is what one might expect. During the operation we learn why no swelling was felt, as then we find around the gangrenous appendix very little pus and but very few soft adhesions.

Every one of us has cured some of these last patients by operating upon them immediately after the diagnosis was made. But all of us also have, with some others, overlooked the diagnosis during a certain period. Firstly, because these cases being of a kind in which positive local signs are missing, we remain hesitating about the appendix origin of the observed septicemia; secondly, because the appendix being incriminated it is very difficult to establish an early diagnosis between the gangrenous form which requires immediate excision of the appendix, and some other very septic forms in which macroscopic alterations of the appendix are very slight, and where it seems that the shock of laparotomy and the disorders caused by anesthesia are prejudicial in stopping, even for a short time, the hepatic and renal functions already gravely involved by the sudden septicemia.

There are cases of grave jaundice with blood-vomitings, in which yellow atrophy of the liver seems to be the result of an appendix folliculitis, at first sight insignificant: the operation, even when made at the beginning, as soon as our attention has been aroused only by a slight subicteric shade, does not improve the progress of the disease. Now, I saw two of these cases—in grown-up patients, I must say—with jaundice, fever and rigors that improved little by little, so that some weeks after I removed a sclerosed appendix with traces of old folliculitis, but without any trace of peritonitis around it.

Therefore, especially in these cases, we remain doubting, and sometimes we allow death to ensue while we are waiting. But while in peritonitis diffused under these conditions we may accuse ourselves of having lost the opportune moment, there is nothing to demonstrate that in operating earlier we should have succeeded better. Experimental as well as clinical study teaches us that the most rapid excision of an inoculated point does not stop infection if it is of a certain degree of virulence. The more so if we are aware of the inoculation only by total and general reaction in connection with it, especially when so deeply situated an organ as the appendix is concerned.

Those cases are happily very rare. The common cases are the peritoneal ones. For these, well treated, sometimes, I repeat it, an abscess will cause us to perform an immediate operation; rarely, we shall be surprised by diffuse peritonitis if the patient is carefully watched; generally we shall succeed in calming the attack. It is well, then, to remove the appendix about a month later if the attack has been slight. When the attack has been grave, we must wait longer, according to the case.

When I began to practice, I thought with many of my colleagues that the operation was not necessary after a first slight attack. Now, on the contrary, we have all agreed about the necessity of operating after such a warning. Relapse is not a necessity, but it is frequent, and we cannot guess how intense might be a second attack.

For this reason we are right in saying that there is no medical treatment of appendicitis. When we do not operate immediately it is but to give time for the acute inflammation to subside; then the operation is less dangerous. I always said so, and I insist upon that, because some authors, whose only excuse might be their perfect ignorance of my writings, have described me as an obstinate abstentionist. You will also kindly allow me, in order to end this debate, to quote the phrase I printed in 1900: "The true question to decide is whether non-operative treatment is capable of calming an attack, when well instituted and in time, and if it is not better to try this treatment as often as possible, and to postpone the operation for a time. To that question I answer in the affirmative."

Before closing this lecture, I must indicate the technique I think the best for the operation. This account will be short because opinions agree, save for some details.

(1) Diffuse peritonitis requires, firstly, a long incision in the right iliac fossa, through which I think we should always try to remove the appendix. Almost always we must add to that first incision a median one, and often a third one, in the left iliac fossa. The drainage must be very free, with very large rubber tubes going in different directions into the abdomen and the pelvis. Sometimes I use irrigations, with boiled water or physiological salt solution, but I do not use them regularly because I am not at all convinced that they improve the always lamentable prognosis of the disease.

(2) Encysted suppurating peritonitis is to be treated as a single abscess by a large opening. No rule need be given; the incision is to be made where the abscess is situated, on the right or on the left, in front or behind. There is a doubt about pelvic abscesses. Some authors teach that the best plan is to open them by rectal incision. It cannot be denied that these abscesses after abdominal incisions progress often worse than the other ones. On the other hand, they sometimes heal spontaneously by discharging through the rectum, hence came the idea to imitate that natural method of evacuation.

In spite of some successes due to that proceeding, I do not believe it ought to become general. I think it is dangerous for the abscesses situated high up, which we must search for blindly, with special trocars; and as to the abscesses low down, which can be felt by the finger near the anus, they almost always can be drained through the iliac fossa—sometimes through the left one, where the swelling and adhesions may be. It is very rare to find the appendix directed downwards and that an abscess has formed in the pelvis while the iliac fossa is entirely free. But when it happens then the rectal incision can be of real help. I remember, for instance, a girl whose iliac fossa I opened. I found the peritoneum here normal, but a hemispherical arch of adhesions transformed the pelvis into a large pus-containing cavity. Judging the escape of pus into the peritoneum to be dangerous, I closed the abdominal wall immediately and opened the abscess by the rectal way. The patient was rapidly cured.

After the spontaneous or surgical opening into the rectum, it is scarcely necessary to say that the appendix is not treated, and frequently it gives no more trouble; not always, however, for twice I have been obliged to remove it afterward, on account of persistent septicemia.

The discussion as to what is to be done with the appendix in localized abscesses has to do with abdominal incisions. Some surgeons have advised its removal always at once. They say that it is the only sure way to stop the peritoneal infection around it, and, later, to prevent such accidents as fistula, relapsing attacks, etc. But, by breaking the adhesions and by inoculation of the serous cavity, this method may cause some post-operative diffuse peritonitis. In these cases I remove the appendix only when I see it easily under the adhesions, and owing to my experience of these cases having extended, I act in this way more and more often. I tie the appendix and cut it with the "thermocautère;" the cecal wall is much too softened to bear a suture destined to bury the stump.

(3). In the delayed operations, "à froid," as we say the *absolute* indication is to remove the appendix, and whatever may have been said, it is always possible, but not always easy. Firstly, the appendix may have in the abdomen various positions scarcely accessible when adhesions exist; secondly, because even when we can easily reach the appendix, some difficulties and dangers may arise from adhesions and from relics of old purulent matter. We must recognize the fact that a positive diagnosis of this state is often impossible. It may happen that before operating we feel in the iliac fossa the cecum to be scarcely thickened or even painful, yet when operating we find, either behind the ascending colon and near the liver, or in the upper part of the pelvis, an adherent appendix surrounded by caseous matter.

For that reason I gave up the vertical incision known in Paris as "Jalaguier's," by which the appendix is removed through the aponeurotic sheath of the right rectus muscle. This muscular band lies afterward opposite the sutured aponeurotic incision, and prevents the occurence of a subsequent hernia. By this method the removal of the appendix is very easy in simple cases; but when we have to seek it deeply, and when the cavity must be drained, we expose ourselves to serious trouble. Therefore, after several attempts, and each time after cases where in operating I found unexpected difficulties, I adopted again the oblique iliac incision named "Roux's incision." But in this the muscles are divided, and often after very good primary union a hernia is to be feared. Then I adopted finally the proceeding of McBurney, in which, after an oblique incision of the skin, the muscles are not divided, but separated along their fibres. The way to the ileo-cecal region is very direct, and if we meet with difficulties, with lesions calling for drainage, we can cut the abdominal muscles upwards or downwards, and we have then all the advantages of "Roux's incision."

SOME FORMS OF VOMITING DURING EARLY LIFE.*

By Henry Ashby, M.D., F.R.C.P.

We are not infrequently called to see cases in practice, in which vomiting is the earliest and most prominent symptom, and we may have found that unravelling its cause and measuring its significance is no easy task. Any of us given to looking backwards will have felt at times the need of absolution for his errors and their consequences.

While vomiting is the physiological reaction of the stomach to a local irritant, the innervation of the stomach through the vagus gives it a very wide connection with the most important organs in the body, and in consequence, vomiting may be the expression of an irritant or toxin acting on some distant part, as well as one acting locally on the stomach.

The normal movements of the stomach after a meal consists in the tonic contraction of the musculature of the cardiac end on its semi-solid contents, and as these are gradually dissolved by the gastric secretions—if digestion is proceeding normally—a series of peristaltic waves proceed from the middle of the stomach towards the pyloric end, the pyloric sphincter relaxes from time to time and allows the fluid to be injected into the duodenum. On the other hand, irritating contents or some reflex stimulus reverse the normal peristalis, the pylorus is spasmodically closed, waves pass from the pylorus to the cardiac end, the cardiac sphincter relaxes, and with or without the assistance of the abdominal muscles, the contents of the stomach are ejected by vomiting. In all forcible vomiting, the stomach is compressed between the contracting diaphragm and abdominal muscles.

It is instructive to note how differently the stomach behaves to various substances ingested, almost as if it was endowed with brains; thus if zinc sulphate be taken, the stomach rejects it without delay as an uncalled-for intruder; if another sulphate—to wit, magnesium sulphate—be taken, it is passed on without more to do, through the pyloric sphincter, for service lower down while if a dose of alcohol be imbibed, it is absorbed by the blood vessels and enters the blood current.

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*Med. Chron.

During infancy the vomiting reflex is ever on the *"qui vive"* like the crying reflex, the coughing reflex, and the heat reflex; all these reflexes are more ready for action, more easily "facilitated" by a slight cause than in later years. We must not, however, overlook the fact that some children vomit much more readily than others, just as some cry more readily, and this is especially true of those of a neurotic type. Moreover, let us remember that morbid habits are apt to be formed and the reflex pathway *via* the vomiting centre, after constant use, offers less resistance than in the normal state, and also that illness and malnutrition render both the crying reflex and the vomiting reflex prone to action.

We must all have made the acquaintance, on the very threshold of practice, of the "vomiting baby." We must all, even in our later and more experienced years, have been outwitted by the same sorry individual and our best laid schemes of dieting have gone wrong and left us in despair. I need not say that nearly all of the really troublesome cases belong to the artificially fed class. Now and again we meet with a baby who cannot retain and digest any form of milk either human or bovine, and in those suffering from stenosis of the pylorus vomiting will occur however fed.

Most of the vomiting which occurs in an infant fed at the breast of a healthy mother is the result of a too rich and abundant food supply, and it is only necessary for us to suggest that some warm water should be given before the infant is fed, and less food given to the infant and more exercise taken by the mother.

The most serious cases are those in artificially fed infants, who not only vomit at frequent intervals, but fail to digest what they retain. Vomiting in such is only a symptom of a far more serious condition than an irritable stomach. There is vomiting and also much colic and distension, and the passage of curdy and unhealthy stools. It must rarely happen except perhaps in pyloric stenosis, that all food is returned and it is of vital importance that the food retained is utilized in the alimentary canal. The class described as "chronic vomiting and marasmus," so common in a large city among the poorer classes, and by no means unknown among the fairly well circumstanced class, has a very high mortality. Many of these infants have from the first had a hard struggle to maintain an independent existence. The mother, perhaps, has made an attempt to nurse and given up the attempt; artificial foods of one kind or another succeeded for awhile, and then not only vomiting but rapid wasting sets in and continues unchecked to the end. There is no more pitiable sight in the world than an emaciated infant, with its blue, skinny limbs and senile facies, stuffing its fists in its mouth, and crying piteously from pain and hunger; it sucks its bottle ravenously and there is peace for awhile; then the jerky, retching movements are seen, followed by the vigorous ejection of the stomach contents; and, alas, discord forthwith begins again!

Hardly less pitiable is the helpless mother, worn out by night watching, and unstrung by anxieties and fears; how difficult to make her understand the situation!

Between the two extreme classes we have every grade. Most of them have their ups and downs, their gains and losses from week to week, but with care and perseverance, the anxious months pass, and finally the disposition to vomit is lost, and the infant grows up passably strong. Success largely depends on the intelligence and watchful care of the nurse or mother, and their stern determination to give no heed to the voices of their friends.

In most of these cases there is a condition of gastric inertia, the stomach dilates from constant distension with gas, given off from decomposing contents, which fail to pass forward through the pyloric sphincter and are retained in the stomach undergoing fermentation until rejected by vomiting. The stomach gets into a condition of food-phobia, a sort of intolerance of food, just as the eye in certain conditions of the conjunctiva and cornea suffer from photophobia. Washing out the stomach enables a fresh start to be made under more favorable auspices, but the amount of food given must be small at first, or the same decomposition changes will take place in the inert stomach. Forced feeding is often helpful. Whey or diluted sterilized milk or fresh milk practically free from bacteria usually suit best; and the food can gradually be strengthened as time goes on and the digestion improves.

But a good deal of coaxing is often necessary before the stomach returns to normal ways and a morbid habit is broken. It is a pity that we have not in our large cities the opportunities of obtaining absolutely fresh and clean asses' and goat's milk, as well as cow's milk, collected under stringent antiseptic conditions.

There is a class of case I should like to refer to in which a correct diagnosis is of great importance for treatment. Let me give an instance. I am asked to make the acquaintance of an infant of eight months old. The history given is that for many months there has been indigestion in the shape of frequent vomiting attacks, pain and colic; diluted cow's milk has been given, but for some reason or other has been changed for various tinned foods, broths, etc., and more recently peptonized milk. Raw beef juice and orange juice have been given regularly. The peptonized milk apparently succeeded at first, but later the vomiting set in worse than ever, and the infant has been rapidly going down hill. My first mental note on seeing the infant is: What a pale-looking baby! A slight examination shows that the nutrition is very poor, there is no tenderness of the limbs, no bruise marks or petechiæ, no enlarged spleen, or any hemorrhages. Can it be scurvy? The gums are pale but normal except there is a pink fringe just round two incisor teeth recently cut, and the same blush is noticeable at the roots of the finger nails. Fresh, undiluted milk is given at first by the teaspoonful, it is never rejected and rapid recovery takes place. In these cases—and this is equally true of the cases in which there is chronic diarrhea instead of vomiting—the alimentary canal revolts against the long continuance of preserved or predigested foods, but will retain and digest fresh milk at once. Possibly the orange juice, given in the above case, rather masked the symptoms.

The worst cases of chronic vomiting in infants a few weeks or a few months old, naturally suggest to us a stenosis of the pylorus. In at least one case I know of, an exploration was undertaken and no stenosis found. At the post-mortem, the walls of the antrum were found somewhat thickened, but there was nothing to explain the almost constant vomiting which had taken place during life. The vomiting of pyloric stenosis mostly sets in within a month or six weeks of birth, usually earlier, and continues without much intermission in spite of changes of food and treatment. But in the earlier stages the diagnosis may be difficult. The stools consist mostly of mucus and bile, and contain no food remains or only traces; the small intestines become more or less collapsed, and the abdomen less rounded than usual; but the most characteristic signs are the peristalsis of the stomach seen through the abdominal walls, and the detection of a tumor by palpation; but the pylorus lies pretty deeply and may easily be overlooked in a crying infant.

While on the subject of vomiting babies, I am reminded how easy it is to make a mistaken diagnosis as between gastric and cerebral vomiting. A healthy-looking infant say of eight or nine months, who is cutting some incisor teeth, has an attack of fever, restlessness and vomiting. The vomiting is not severe and subsides under ordinary treatment. The trouble is apparently over and the doctor takes his leave, or omits to call for a few days; he is then hastily summoned to find the infant in convulsions or comatose, and then it is only too apparent that the vomiting was not gastric or due to teething, but to a commencing meningitis. I do not think that the character of the vomiting is distinctive in meningitis, but often the condition of the fontanelles and the state of the reflexes may assist the diagnosis.

Vomiting with fever occurs in several different pathological states. There is the initial vomiting of scarlet fever, which in rare cases continues for a few days and gives rise to some distress, and may help to obscure the diagnosis. Then there may be severe and continuous vomiting in the early stage of penumonia, especially when the left base is affected, and there is also severe vomiting at times and high fever in influenza. Some years ago I saw some cases of what I took to be influenza in children, in which the temperature ranged from 105 to 106 with continuous vomiting, which ended fatally in a few days, without any definite signs of meningitis, pneumonia or peritonitis being found after death.

I have seen a few cases of what has apparently been acute gastritis in children arising without known cause, in others the patients were convalescent after attacks of scarlet fever or diphtheria.

One of these much impressed me at the time. A boy of 3½ years, who had always been in good health up to the time of his fatal illness, was seized one evening—apparently without cause—with vomiting and purging. The diarrhea soon stopped, but the vomiting continued till his death at the end of a week. For the first 24 hours or so there did not seem any cause for anxiety, as there was no distress and no fever. The first symptom to cause anxiety was the vomit becoming streaked with bright blood. A day or two later he became drowsy, the abdomen more or less collapsed and concave, and he vomited a brownish colored material, due to altered blood. The stools also became black from the presence of blood. The temperature was subnormal, and during the last day or two the limbs assumed the position seen in tetany. At the post-mortem the stomach was found markedly dilated, the capillaries were injected and minute hemorrhages were present. There were patches of congestion in the intestines. The other organs were healthy, including liver and kidneys, but no microscopical examination was made. The urine was free from albumen, but was not tested for acetone.

I saw a similar case some years ago in which the vomiting set in on the ninth day of a sharp attack of scarlet fever, ending fatally on the twentieth day, reckoning from the initial vomiting of the scarlet fever. There was the same intense vomiting of brownish material and passage of black stools. At the post-mortem, a dilated and apparently inflamed stomach was found; the kidneys and liver were pale, but there was no evidence of nephritis.

Other cases very much resembling the above occur during convalescence from diptheria and end fatally; persistent vomiting setting in during the course of diphtheria or during convulsions is a symptom of the greatest gravity.

We can hardly discuss vomiting as a symptom during early life without some reference to a large and indefinite class of cases, differing more or less from one another and yet having some sort of a resemblance known under various names such as "bilious attacks," "recurring gastric catarrhs," "food fever," "cyclic or intermittent vomiting." A child is said by its friends to be subject to bilious attacks which occur every few months or less, and with which are accompanied vomiting, headache, perhaps fever. These attacks last a day or two or more and then pass away but recur from time to time. Sometimes the attack is of a more distinct febrile nature with nausea, the fever lasting some days. In many of these cases there is distinct evidence of a dilated stomach, fermentation of food habitually takes place, and periodically the toxins formed give rise to an attack of vomiting. Such children often have pale-colored stools and poor appetites. For the most part these children digest milk and starch, such as porridge and puddings, badly, and it is important to lessen the amount of these taken.

But there is another type of case to which the name of "cyclic" has been applied in which there is often very little evidence at any time of indigestion or gastric derangement. Their etiology is by no means clear. The attacks are apt to occur in neurotic children in the same way as "recurring fever" and epileptic attacks, and it seems rational to suppose that the accumulation of some toxins or uric acid in the system may be the cause of such seizures, in some giving rise to vomiting, in others fever and in others epilepsy.

The vomiting mostly begins suddenly and continues without intermission for several days, during which time the child may be excessively exhausted from the forcible retching and vomiting. The abdomen becomes retracted from collapse of the small intestines, the eyes sunken, the child drowsy and with quick and feeble pulse. There is no abdominal pain; constipation is usually present. The diagnosis is difficult, especially if there has been no previous attack, and the exhaustion of the patient gives rise to a good deal of anxiety, and indeed in a few instances of this nature death has actually taken place. In by far the majority of instances the vomiting ceases after a few days, to be followed by a rapid improvement. The temperature in some cases is as high as 104° or 105° F. at first, but during the later stage it is practically always subnormal.

The drowsiness that is apt to accompany, as well as the odor of acetone in the breath, and its presence in the urine, suggest some toxin in the system. The significance of this is by no means certain, as acetone is present both in acute gastro-intestinal disturbances and also in diabetes. Perhaps I need hadly say it is important in these vomiting cases to examine the urine for albumen as well as acetone, and to test the vomit for excessive quantities of hydrochloric acid.

That such cases as these with vomiting and drowsiness may be easily mistaken for meningitis is certain, in rare instances the similarity of symptoms between gastro-intestinal intoxication and meningitis is still more striking. Thus, for instance, a child is seized with convulsions, constant vomiting and fever, followed by a condition of profound coma with Cheyne-Stokes respiration. The smell of acetone may be detected in the breath. Then, perhaps after a few days, during which time he has been freely purged, an entirely unexpected improvement takes place, to be followed by complete recovery.

I am tempted to relate a case in which, although vomiting did not play a prominent rôle, there was uncertainty for the greater part of the illness as to whether the case was primarily gastro-intestinal or cerebral.

A girl of two years and two months (a patient of Dr. Corkhill's of Southport) was seized one evening with vomiting and fevernishness; the vomiting lasted a few days only and seemed to cease when the stomach had been thoroughly emptied. When I saw her on the fourth day with Dr. Corkhill, temperatures were running 104° to 105°, she was heavy and drowsy but quite rational, there was no pain or tenderness, the reflexes were normal, the bowels had acted well with calomel, bringing away some lumps of curd. There was slight squint at times due to paresis of the left internal rectus, which, however, disappeared in a day or two. The attack at first rather suggested an auto-intoxication, especially as the child had been overfed, but the presence of the paresis of the external rectus made us suspicious of cerebral irritation. The pulse was quick and poor. I saw her again on the seventeenth day and was told she had remained very much in the same state, the temperatures were high, 105° to 106° F., the drowsiness about the same, there had been some diarrhea, but examination of the blood for enteric fever had been found to be negative. There was no pain, no paralysis, no sighing respiration, nothing to suggest meningitis except the wasting and drowsiness, but the presence of high fever, more or less discounted the value of these symptoms.

But a few days after this she developed more or less rigidity about the muscles of the neck and limbs, and lumbar puncture by Dr. W. B. Warrington resulted in the demonstration of Weichselbaum's diplococcus. Death followed a few days after, but the diagnosis of cerebro-spinal fever was abundantly clear.

Initial vomiting, marked drowsiness, with Cheyne-Stokes respiration means meningitis and a fatal result five times out of six. But in the odd case these symptoms may be due to toxins absorbed from the alimentary canal, enteric fever, influenza, or pneumonia. High fever is rather against tuberculosis meningitis, but may be present in a pneumococcal meningitis or as in the above case, in cerebro-spinal meningitis.

I fear I have no time to discuss the question as to the nature of the severe vomiting which at times follows the inhalation of chloroform or other anesthetic, or the cases which are known as delayed chloroform poisoning. Both may be accompanied by acetonuria, and at times the vomit contains grumous blood. The investigation of these cases seems of the greatest importance.

Let me say a few words about vomiting as a symptom of peritonitis, especially in those cases in which many of the signs which we are accustomed to associate with peritonitis are either absent or at any rate not pronounced, such, for instance, as tenderness, distension and fever. Vomiting, in the absence of much local tenderness or colic, may easily lead our diagnosis astray, especially as excessive vomiting strains the abdominal muscles and gives rise to a feeling of soreness. The temperature may be subnormal or quickly become so, the abdomen may be flaccid, and palpable without pain, even in cases where no opium has been given. In many cases at least of peritonitis there is obstruction of the bowels, the result of the coils of the intestines being glued together with lymph, though from time to time flatus may escape.

In the following case of acute vomiting (seen with Dr. Fox of Accrington) we were not by any means sure as to the cause. A boy five years old, who had been fairly healthy up to time of his illness, was seized with vomiting a few hours after dinner on Christmas Day. There was a degree or two of fever at first, but hardly any pain was complained of. When I saw him on the fifth day the abdomen was soft and flaccid, he could bear without flinching deep pressure, but put his hand on the umbilical region and said he had some pain there. The legs were not drawn up, nor could any coils of intestines be seen through the abdominal wall. The sickness had continued since the commencement, latterly the vomit had largely consisted of bile. There had been no action of the bowels, though apparently some flatus had passed. The boy was drowsy, evidently very ill, with a dry, baked tongue and a rapid, poor pulse. Was this a case of toxic vomiting? The history of coming on after a Christmas dinner certainly suggested this, and the absence of pain and distension of the abdomen favored this view; but on the other hand the obstinate constipation and the failure to relieve this or do more than empty the large bowel by enemata, certainly suggested some local abdominal lesion. A day or two later the increasing collapse and commencing distension made it clear that there was obstruction of some sort. Mr. G. A. Wright performed laparotomy and found a general condition of peritonitis and a small collection of pus. A fatal result followed a day later.

I will only refer to one other form of vomiting and that by no means a common one. A girl of nine or ten years of age is vomiting considerable quantities of bright blood, and passing bright colored blood in the stools. There is a good deal of obdominal pain and colic, so that she sits up in bed leaning forward, or lies flat on her stomach. An examination of the surface of the skin shows a number of scattered purpuric spots, especially on the extensor surfaces of the limbs. Possibly, in some of these cases there may be no evidence of purpura, but we can obtain a history of such, or they come out later. It is tolerably certain that such a case belongs to the class known as Henoch's purpura.

Ulcers, both of the stomach and duodenum, occur both in the newly born and also in children, and fatal bleedings may take place, but they are much more common after puberty.

ACUTE DISEASE OF THE BONE IN CHILDREN.[1]

By George Rose,

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The subject of Acute Disease of the Bone in Children is one that forced itself on my mind after I joined the staff of the Children's Hospital, for, in operating in these cases, the pathological appearances differed so greatly from the descriptions given in the various text-books of the time, and they differed so much in apparently similar clinical conditions, that for a time I felt hopelessly at sea. Acute Periostitis, Osteomyelitis, Acute Necrosis and Septic Arthritis were regarded in some text-books as distinct diseases with little or no relationship to each other. In other text-books, chiefly British, Periostitis was the primary disease; in Continental it was held to be Osteomyelitis. In none of these text-books was any explanation given why the end of a bone was always the part first affected, nor was there any explanation why, on operation, the medulla was often found healthy when osteomyelitis was regarded as the early disease. Equally wanting was a reason for the hip-joint being so frequently affected by acute septic arthritis, an occurrence which is invariable when the head of the femur becomes the object of acute disease. If the primary disease was either periostitis or osteomyelitis, why was not the middle of the shaft of the bone sometimes first affected, and why might the lower end of the femur or the upper end of the tibia become diseased without the knee-joint becoming involved, when the hip-joint never escaped when the head of the femur was affected? To get an answer to these questions, and to discover the relationship, if any, of these different pathological conditions, I set about noting the various features in each case, the history of the onset, the clinical appearances, and the pathological condition found on operation, noting whether the operation was done on a recent or a late case. The result of my observations I wish to lay before you briefly to-night.

Now, this subject is of importance, from the *commonness* and from the *virulence* of the disease.

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[1] Scot. Med. and Surg. Jl.

During the past twelve years I have seen, and treated, in private and in hospital, over one hundred cases of this complaint, and at the time I write we have six cases in hospital under treatment. Its *virulence* may be judged by the fact that our average mortality is over 20 per cent. Some years ago, in examining the reports of various children's hospitals, I found the mortality of the various acute bone diseases was 25 per cent.; and when we recollect that, even when life is saved, limbs are often rendered useless and are almost invariably diminished in utility, whatever leads to an earlier diagnosis, a better understanding of the disease, and a better method of treatment, is worthy of consideration The name now given to this disease is Acute Septic Diaphysitis, a name which I would accept as being accurate and descriptive. Acute Epiphysitis is a less satisfactory name, as the epiphysis is not involved primarily, while the terms Osteomyelitis. Periostitis, and Acute Necrosis should be used to describe the results of this disease.

If it be asked how these different names for this disease have arisen, the answer is that they have been given from a mistaken view of the pathology.

When we incise, in one case we find the bone denuded of the periosteum along its whole length; in another case we find the periosteum intact but the medulla full of pus. Again, on cutting on the neck of the femur, we may find the head lying loose in the acetabulum, or we may find the head of the bone attached to the neck, but the joint full of pus. Each of these conditions got a name, and no attempt was made to trace them to a common source, which would have cleared up all confusion and made the pathology and course of this disease plain and simple.

The key to a proper understanding of acute bone diseases is to be found in the anatomy and histology of the tissue adjacent to the epiphyseal cartilage. Immediately below the epiphyseal cartilage, and on the diaphyseal side, is a layer of vascular and actively-growing embryonic tissue, full of blood-vessels which terminate in loops. This layer of tissue is continuous with a like layer lying underneath the periosteum, and with a third layer on the epiphyseal side of the cartilage. We know the growth of the bone is most active on the diaphyseal side of the epiphyseal cartilage, as increase in the length of the bone is mainly from that point, and the tissue there is more tender and more susceptible to injury. Now if, on account of some injury, a small clot of blood has been formed in that situation, *i.e.* on the diaphyseal side of the epiphyseal cartilage, and any germs circulating in the blood find a lodgment in the blood-clot and set up inflammatory processes, I think we can understand the various methods by which the different pathological conditions are produced. These conditions will necessarily vary according to the bone affected, to the age of the child, to the amount of ossification of the epiphysis, and to the virulence of the invading micro-organism. Take, for example, a case where the head of the femur has become affected. Remember, the epiphyseal cartilage is intra-articular in the hip-joint. The micro-organism has found lodgment in the supposed site in the centre of the bone at the diaphyseal side of the epiphyseal cartilage, and suppuration has resulted. What course can the pus pursue as it accumulates? It must find vent, and the possible routes are:—

It may (*a*) penetrate or burrow through the epiphyseal cartilage and the epiphysis into the joint (only where the epiphysis is not ossified will this route be possible). (*b*) Burst off the head of the bone. (*c*) Pass along the surface of the cartilage, and open by a small aperture on the side of the neck of the femur, and into the joint. These three processes will, in the hip-joint, set up a septic arthritis. (*d*) In passing to the outside, the pus may burrow below the periosteum, and passing down the shaft of the femur, set up periostitis, and stripping off the periosteum completely, give rise to what has been described as acute necrosis. Or again, (*e*) it may pass downward into the medulla of the bone and set up osteomyelitis. This last result is not very frequent at the hip-joint.

Suppose now a case where the lower end of the femur or the upper or lower end of the tibia has become affected, and where the germs have found lodgment in the centre of the bone at the epiphyseal cartilage. Here the epiphysis is not intra-articular. The pus, pursuing the previously-mentioned routes, may set up the same conditions, but as septic arthritis can be set up only by the pus following routes (*a*) or (*b*), and this is comparatively rare, osteomyelitis is the most frequent result, or osteomyelitis and periostitis, while septic arthritis, in the early stage of the disease, is rare. If, however, the disease begins, not in the centre of the bone, but at the surface, a frequent occurrence at the lower end of the tibia, the course is that of periostitis, as the pus tends to run below the periosteum. Only the outer edge of the epiphyseal cartilage is inflamed, and, although the whole of the periosteum may be stripped off the bone, the medulla will be found quite healthy. This explains why some cases do well after an early incision through the soft tissue. Lastly, in cases where the disease has not been treated, as time passes, on account of the vascular communication between the surface and the interior, the whole bone will become affected, and the joint sooner or later will be involved.

These are the pathological conditions found occuring in acute disease of the bone, and, by regarding them as arising from a primary acute diaphysitis, their relationship and causation may be explained. This is the view now held by those having most experience of these bone diseases, as it accounts for all conditions. In operating on early cases we may find no periostitis; we may drill into the medulla and find no osteomyelitis; but at the epiphyseal cartilage, disease, either central or circumferential, is always to be found.

And here I may point out that often there are few physical signs to be discovered in this disease, even after the constitutional symptoms have appeared. There will be pain and impairment of motion at the joint, but there need not be, in the early stages, the smallest amount of swelling, for the pus is but small in quantity and may be deeply seated in the bone, and not until the pus finds vent or sets up secondary inflammation will there be anything discoverable other than a lack of mobility and an increase of heat.

The Causation of the disease is due to the entrance of a micro-organism into the part affected. The micro-organisms that we have found present have been the staphylococcus pyogenes aureus, the streptococcus pyogenes, and the staphylococcus pyogenes albus, and once what seemed to be the pneumococcus. Of these, the staphylococcus pyogenes aureus is the most virulent, some cases when attacked by that organism ending fatally in forty hours. Those cases due to the staphylococcus pyogenes albus are the most mild and run a less acute course, while the results of operation are better. Those due to the streptococcus pyogenes vary from virulent to fairly mild.

The method by which the micro-organism gains access to the system is not always discoverable. Frequently, if the body be examined narrowly, we find the mark of a recent poisoned wound, and may even discover inflammation of the lymphatics and enlargement of the glands, but often there is no apparent lesion. Still, with decayed teeth, enlarged tonsils, nasal catarrh, and the ubiquity of these micro-organisms, there is no great diffiiculty in accounting for their entrance.

Predisposing causes are bad hygienic conditions, a sudden chill, bad health due to a recent attack of measles, scarlatina, or whooping-cough, but we often find that this disease attacks those who are apparently strong and in good health, and in some of these it may run its most rapid course.

This disease may attack any of the long bones. The femur, the tibia, the humerus, the ulna, the radius, the clavicle, and the phalanges of the hand and foot are alike susceptible. The most frequently affected is the femur, in either its lower or upper end; the lower end of the tibia comes next, while the humerus makes a good third.

After infancy, boys are more frequently attacked than girls, probably on account of their being more liable to injury. My experience as to the age at which this disease most frequently occurs is somewhat different from other writers, it being most frequent, in my experience, about the age of three. Twice during the present year I have operated on children of three weeks old where a septic umbilical cord gave entrance to the germs, while the oldest patient that I have met with was seventeen years of age

The symptoms to be observed generally are as follows:—

We find the history of an injury, such as a fall or a twist; the child becomes fretful, listless, and cries when it is moved; the pulse is very rapid and the temperature high. As the case progresses, the face of the child becomes of a dirty earthy hue, almost pathognomonic; convulsions are common, and often delirium is present. During the first few hours a physical examination may reveal nothing more about the joint that is affected than extreme tenderness, want of mobility, and a slight increase of heat. Soon, however, swelling is noticed, and in some cases, with an increase of the swelling, there is remission of the constitutional symptoms. The temperature falls a little, the child becomes less fretful, and the limb, though swollen, is not so tender when touched.

In other cases this swelling passes up or down the limb; the whole thigh, forearm, arm, or leg becomes red, tense, and shiny, and the constitutional symptoms suffer no diminution. In cases *where a remission* of the symptoms has occurred, it means that the pus has found vent from the interior of the bone, and on account of the diminished tension the pain has also become less. In those cases where *there is no remission* of the symptoms, and where the swelling has continued to increase, we find that the pus has run under the periosteum, stripping it from the bone, and causing, with an associated osteomyelitis, continued intense pain. If the disease is of the most virulent type, the constitutional symptoms will be severe from the very first, temperature running from 103 deg. to 105 deg. F. The pulse will be rapid and small, delirium will quickly supervene, and, even before there is almost any swelling to be made out, the child may die of toxic poisoning. In cases less severe, if left alone, death may result from septic pneumonia, pleurisy, or pericarditis, or from exhaustion.

And here I may be permitted to remark how seldom this disease is diagnosed in its early stages. In infants of under a year, often the symptoms are regarded as due to gastric disorders or to teething; and I would urge that, in every case of severe illness in a child, the limbs be moved and handled in order to exclude the possibility of this disease being present.

When the child is older, even where a painful joint has been discovered, the condition, alas! is too often set down to acute rheumatism, and valuable time is wasted, the limb rendered useless, and even the life of the child sacrificed, before the medical man realizes the nature of the complaint he is dealing with. Indeed, I make bold to say that in no disease that I know of are mistakes so common, and in few is the result of the mistake or delay more serious. Case after case is admitted to the Hospital, and the tale is almost invariably the same—"It was not diagnosed." It is with no feeling of self-complacency that I make this assertion so derogatory to the diagnostic acuteness of my medical brethren, for, before I conclude, I shall give proof that, in dealing with this disease, I have had ample grounds for clothing myself in sackcloth and ashes.

DIFFERENTIAL DIAGNOSIS.

Acute articular rheumatism and erysipelas are the diseases for which this disease is most frequently mistaken.

With the history of a recent injury one might mistake the swelling for erysipelas associated with the injury; but there is seldom that redness we find in erysipelas, and never the clear, well defined margin between the inflamed and the healthy skin. In addition, deep pressure would show that the pain was in the bone and not superficial.

Acute articular rheumatism is a frequent but bad diagnosis, and is excusable only when, as is rare, more than one bone is affected. The disease, except at the head of the femur, is not a joint disease, and although the tissue surrounding the joint may be inflamed, we should remember that there is no monarthritis in a child. Acute monarthritis, due to gonorrhea, we do meet with in the adult, but in a child, excluding the presence of gonorrhea, if we find an inflamed joint with severe pain associated with grave constitutional symptoms, we may safely conclude that it is acute septic diaphysitis. Certainly we may be sure it is not articular rheumatism.

TREATMENT.

With such pathology there can be but one form of treatment for this disease, viz. immediate incision. No time is to be lost, for a few hours may make all the difference between success and failure. Even although one be in doubt (and it does require nerve to incise into the hip-joint where there are no physical signs of pus) it is better to incise and not find pus, than to delay and sacrifice the limb and possibly the patient. I have never yet cut down on the bone of a suspected case without finding pus, but I have several times delayed operation with injurious results.

As a preliminary, the limb has to be cleansed and disinfected as thoroughly as for an aseptic operation. The incision has to be made down on the epiphysis at the end of the bone. *If pus be found,* a search may be made for the opening in the bone by which it has come to the surface, and this opening, if found, may be enlarged; if no opening is found, one must be made, and the bone cavity carefully washed out with some sterile or antiseptic solution. *If the pus be not found,* then the surgeon should cut into the bone over the site of the epiphyseal cartilage, using a longitudinal incision parallel to the long axis of the bone. The pus having been found, copious irrigation should be employed, and, if the quantity of pus be not large, it may be wise to risk treating it as an aseptic wound. This is specially desirable in an early case of disease of the neck of the femur. Should the pus have passed below the periosteum and filled the surrounding tissues, it is better, after washing out and irrigating well, to insert drainage tubes, dressing aseptically. As a result of incision and evacuation of the pus, the temperature falls, the pulse becomes slower, the pain passes away, and, with the limb fastened on a splint, the patient enjoys comparative comfort. Of course the usual constitutional treatment will be given. Iron, strychnia, and good food will help to complete the desired cure.

If the constitutional symptoms are severe, with great denudation of the periosteum, amputation should be performed at once. Cases run their course so quickly, there is so little hope of the limb being useful, and the risk of secondary infection is so great, that it is better to sacrifice the limb than to risk those secondary infections and the resulting complications. In cases where the denudation of the periosteum is great, but where it does not involve all the circumference of the bone, if the constitutional symptoms are not severe, drainage may be employed at various points, and, leaving the wound open, we may trust that in time the necrosed bone will be exfoliated and fresh bone formed by the remaining periosteum.

While a certain percentage of patients recover by incision, the bulk of them require further operation. As pieces of necrosed bone are thrown off from time to time or become loose, an anesthetic will be required to allow of sequestrotomy and clearing out of the medulla. After this has been done, the cavity should be packed with worsted threads which have been steeped in iodoform. But while the bulk of patients recover after a lapse of several months, some few cases will require amputation in order to save the patient from dying from exhaustion and waxy disease.

Not unfrequently we find more than one limb involved, and in such cases the prognosis is less favorable. Where the disease is so extensive, it may be wise to sacrifice one limb in order to give the child a chance of combating the affection of the others. Still further, even although we may effect a present cure, if the cartilage has been greatly affected, as the growth of the child proceeds the affected limb will be shorter and of less use than the other. But it is wonderful how well many of these cases do, and how a useful right arm may be gained even where it has been necessary to remove two inches of bone from the upper end of the humerus.

It is impossible in such a paper as this to give an account of many cases of this disease, and I shall therefore give briefly typical examples of the various forms I have described. First let me give you an example of how rapidly fatal it may be.

W. A., aged seven, a boy in good health, attending school, on a Tuesday at mid-day received a kick on the leg from a schoolfellow. Through the night he became feverish, complaining of pain over the left ankle. During the next day he rapidly became worse; and when I saw him on Wednesday night about twelve o'clock, he was delirious, pulse 150, temperature 104 deg. It was only after careful inquiry that I got the history of the injury and his complaint of pain, and a most careful examination showed only a slight swelling over the external malleolus of the left leg. The symptoms were so acute that I was inclined to suspect meningitis, and delayed removal of the child to the Hospital. On calling next morning I found the child had died in the night, and subsequently, on incising over the malleolus, I found denudation of the bone with escape of serous fluid, which had not yet become pus, though pus was found in the bone. Manifestly,in such a case, immediate amputation was the only treatment.

In January, 1894, I was called to see W. R., a child of six months. It had been fretful for a few days; there was vomiting, bowels were loose, offensive, and the motions green and slimy. The day previous to my visit it had become rapidly worse, crying constantly, and evidently very ill. When I saw the child its face was pale, pulse 130, and temperature 103 deg., and its cry was a pitiable whine. The abdomen was distended and tender, but, so far as my examination went, all else seemed normal.

I regarded it as a case of gastro-intestinal catarrh, and prescribed accordingly.

Although the bowels improved, the child got worse. The tongue became dry and brown, sordes appeared on the teeth, and the face became of a dirty earthy tint.

After a day or two the mother mentioned that the child could not bear to be lifted. On stripping the infant, a swelling was found over the right hip-joint, and the limb hung flaccid. The diagnosis was quite plain; and, on removal of the child to the

Hospital, I had the mortification of finding the head of the femur lying loose in the acetabulum, and the hip-joint full of pus. As amputation was refused, the child lingered for a while, developed pyemia, and died.

The fault was entirely mine, my examination was not complete. Since then I have made it a rule, after examining the chest and the abdomen of any infant, to take hold of both elbows and rotate the arms; then, seizing hold of the knees, to do the same to the legs.

I am glad to say that this was my last serious mistake in recognizing this disease, and I would venture to impress upon those who have to treat children the importance of following the method of examination as described, to ensure that the limbs are sound and healthy.

As an example of how well cases may do if but treated early let me relate the following:—

A child of two years had suddenly become ill, screaming loudly and continuously, especially on the slightest movement. It was noticed that the right leg could not be moved, and the medical man who was summoned ordered the child's removal to the Hospital. I saw it six hours after its illness commenced. Temperature was 102.5 deg., pulse 120. There was marked tenderness over the right hip-joint, but no swelling, and no fluctation. I regarded the case as acute diaphysitis of the neck of the femur. I opened the joint by the anterior incision, and on reaching the neck of the femur there appeared nothing abnormal, but on drilling in on the epiphyseal cartilage a small quantity of pus escaped. The joint was washed out with a warm solution, a drainage tube was inserted, and the wound stitched up. The temperature and pulse fell, the child became quite comfortable and free from pain. Irrigation was done for a day or two, the tube was removed, the wound healed by first intention, and, I am glad to say, the child has a limb as healthy as though it had not suffered from this disease.

I have had another case of like nature in my own practice, and with the same satisfactory result. At present there is a subacute case in the Hospital, where we expect a like satisfactory result.

F. J. P., a strong, healthy boy of twelve, was on the 12th of July, 1904, struck on the left wrist with a brush by another boy, and had his arm twisted violently. He passed a restless night, and in the morning the forearm and wrist were swollen, red, and painful on movement. The medical man who saw him on the 14th found the pulse rapid and temperature 101 deg., the arm stiff and swollen. He was admitted to the Hospital on the 15th, and the whole forearm and elbow-joint were swollen, brawny and hot, and a large part of the skin on the outside was red, but there was no evident margin. Temperature was 104 deg., pulse 132.

I operated in the evening, and found the upper third of the radius denuded of periosteum. The bone was opened and pus was found. Flushing was done and drainage tubes were inserted. He had a restless night, was delirious, and at 9 A. M. the temperature was 104 deg., pulse 154. There was subsultus tendinum, and picking of the bed-clothes. At noon, I amputated through the upper arm, and 6.30 the same night the pulse was 115, the temperature normal, and the patient much better. I found the whole of the ulna and upper part of the radius were denuded of periosteum. He did well till the 21st, when the temperature rose to 102 deg., pulse 116, and he complained of pain over the left internal malleolus, which was tender on pressure, and the lower part of the leg somewhat red and swollen. On the 22nd I incised over the lower end of the left tibia, and found the bone stripped of periosteum, and on making an incision down to the epiphyseal cartilage about one drachm of pus was got. It was washed out, drained, and it healed somewhat slowly. Some time after he returned to the Hospital to have some pieces of necrosed bone removed from the lower wound, but when last seen the leg had healed satisfactorily and was quite sound. The arm also healed well.

Another case with a history almost similar, but where it was the tibia that was denuded of periosteum, and where the constitutional symptoms were also similarly severe, required amputation. The micro-organism in both cases was the staphylococcus pyogenes aureus.

O. W., nine years, had been ailing with a swelling in the right shoulder for five weeks.

When I saw him there was the history of severe pain, swelling in the right shoulder, and delirium. After a few days the swelling increased, but the pain became less and the delirium passed away. Although the patient seemed somewhat better, the arm could not be moved. I operated, and, on cutting down on the head of the humerus, found it necrosed and the surrounding tissue full of pus and blood-stained debris. I removed two inches of the head of the bone, and, after a lapse of twelve months, the boy has a useful right arm, strong and servicable.

In this case it was when the pus found vent that the pain became less and the constitutional symptoms milder. The micro-organism found was streptococcus pyogenes.

This list of cases might be greatly enlarged by giving notes of a case where the head of the radius had been burst off and was lying loose in the joint; and another where the lower end of the femur was affected and the pus found its way to the popliteal space by a small opening in the intercondylar notch (complete recovery resulted). Both were due to streptococcus pyogenes. But to add to the list would be a tax on your forbearance. Sufficient to say that any of the long bones may be attacked, and the disease in any of them may be so severe as to cause the death of the patient. The phalanges of the hands and feet are often affected, and I hold the opinion that some of those so-called deep-seated whitlows are, in young people, not whitlows, but cases of acute diaphysitis. Enough has been said to show the seriousness of the disease, the liability to errors in diagnosis, and the need of prompt interference at the earliest possible period.

Whether the view I have given of the pathology be correct or not, it is a view beginning to be held by those who have most experience in treating these acute bone diseases, and it has the merit of explaining, in a simple manner, all the clinical and pathological conditions found, and of bringing together the different forms of bone disease in children, and showing them to be varying manifestations of the same primary form, *i.e.*, acute septic diaphysitis. To sum up briefly in two propositions, I consider:—

First, that in the long bones of children, acute diaphysitis is the primary disease, and that acute septic arthritis, acute periostitis, acute osteomyelitis, acute epiphysitis, and acute necrosis are but results and manifestations of the original pathological condition, and that these different manifestations are due partly to causes not yet understood, but partly to evident enough causes, such as the virulence and site of the attacking micro-organism, the varying amount of ossification of both epiphysis and diaphysis, and to the relation of the epiphyseal cartilage to the capsule of the joint.

Second, that when, at the end of any of the long bones in a child, we find great pain and tenderness on pressure, associated with severe constitutional symptoms, it is our duty, even before there be visible swelling, to regard it as a case of acute septic diaphysitis, and to operate immediately.

My thanks are due to Dr. Dean, formerly of Aberdeen, now of the Lister Institute of Preventive Medicine, and to Dr. G. M. Duncan, Aberdeen, for the examination and identification of the organisms.

FOOD FEVER IN CHILDREN.*

By Eustace Smith, M.D., F.R.C.P.,

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I propose to describe, under the name of "food fever," a class of cases with which I have been familiar for a number of years. The disorder consists of an attack of fever which comes on suddenly, is accompanied by signs, more or less pronounced, of digestive disturbance, lasts in its acute form for several days and may linger on in a modified degree for some weeks. If these attacks occur frequently—once a month or so, as they sometimes do—their effect upon the nutrition of the patient is highly injurious.

Dr. H. Davy, in the *Lancet* of Sept. 24, 1904. published an interesting paper on this subject, which he called "Fever in children caused by the indigestion of certain kinds of carbo-hydrate foods." Dr. Davy instanced the case of his own son, who suffered repeatedly from this form of pyrexia. The attacks came on quite suddenly and without discoverable cause, and by their frequency interfered greatly with the boy's nutrition, brought his education to a standstill and kept his parents in a state of continual perplexity and alarm. I have already described these cases in my large work on *Disease in Children,* under the name of "acute recurring gastric catarrh." It is not, however, every case of recurring gastric catarrh which presents these symptoms, but those which do exhibit them are so characteristic, and to many practitioners so puzzling that I have thought it might be convenient to group them together under a distinctive name.

SYMPTOMS.

The subjects of the complaint are usually neurotic children of either sex between the ages of 3 or 4 and 10 or 12 years, although I have seen cases in children still younger. The attack begins with headache, accompanied sometimes by vomiting, sometimes by looseness of the bowels, but always by signs of some kind of digestive upset. The child lies about with a dull, pasty face, a dirty tongue; he does not care to play, and has a temperature of from 101° to 105°. If the abdomen is examined, the stomach resonance is found to reach higher than normal—often nearly as high as the left nipple—and the edge of the liver can be felt one or two fingerbreadths below the costal margin. The water is very high-colored, or thick and very acid.

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*Brit. Med. Jl.

If the case is left alone, or not treated properly, the temperature remains for some days continuously higher than the normal level, and at some period of the twenty-four hours shoots up still higher. It generally rises a little after food, and is almost always 102° or more in the evening. At the end of a few days it subsides, either suddenly after a profuse sweat, or gradually, but is often moderately raised (99° to 101°) for a week, or even longer.

If, when the fever begins, the child is given a good dose of calomel or blue-pill, the temperature generally falls directly the medicine has acted; but instead of remaining low, as it would in an ordinary case of upset, it rises again in the course of a few hours, and in the evening generally reaches 100°, or a little higher. For several days afterward the temperature may remain uncertain—not continuously higher than normal, but rising above a healthy level at some period of the 24 hours, in the evening or after a meal. The children, as a rule, make no complaint of bodily discomfort, but are fretful and irritable in the day, and at night lie awake or sleep badly, grunting and groaning and tossing from side to side. Often they do not care about their food, and sometimes it is most difficult to make them eat anything at all. The younger children, when forced to take food into their mouths, roll it about from one cheek to another, as if they could not bring themselves to swallow it.

Children who have these attacks only at rare intervals soon recover their health after the temperature has fallen to its normal level, and seem in no way the worse for their indisposition. If, however, as sometimes happens, the attacks are repeated every five or six weeks, nutrition soon begins to suffer. Such children are pale and thin, have little or no appetite, and, even if lively and active, have habitually a languid circulation and cold feet. These signs of malnutrition are generally accepted by the parents as the necessary outcome of a supposed delicacy of constitution. It is the frequent recurrence of fever which causes so much anxiety, especially as the attacks come on quite suddenly and without obvious cause. A child seems in his usual health, is perhaps going to school regularly and joining briskly in all the school games. One morning he leaves his home apparently as well as usual, but returns in the evening flushed in the face and complaining of headache. His temperature is taken and found to be 102° or higher. The complaint then follows its usual course. Some of the attacks, however, have special symptoms. A highly neurotic child may have a fit of convulsions, which may be repeated again and again. In a certain proportion of the cases a prominent symptom is vomiting, which may persist for several days, and I am strongly of opinion that many of the cases described as "periodic" or "cyclical" vomiting are of this nature. The vomiting is sometimes accompanied by pain in the epigastrium or umbilical region.

A little girl of six was subject to sudden attacks of fever, with vomiting and pain in the pit of the stomach. The febrile condition always lasted five days, during which time she looked yellow without being actually jaundiced, and her bowels were very confined. The child when I saw her was supposed to be well, but she looked very pale and thin and her feet were bitterly cold. She was brought to me that I might suggest some means of preventing the attacks.

The pain is sometimes the most distressing symptom.

A child of eight was brought to me because she had suffered for more than a year with attacks of acute abdominal pain and high fever which came on every three or four weeks. The child, after a restless night, would complain in the course of the morning of severe abdominal pain. Her temperature would be 103° or 104°. The pain always went on continuously for three days, the child sitting or lying with her knees drawn up and crying with the pain. Sometimes she was sick. At the end of the three days the pain and pyrexia would subside, leaving the patient much weakened, with a poor appetite and dislike to any exertion. I put the child upon a strict diet and enjoined special precautions against chills. I heard two years afterward that attacks had ceased from the time the treatment was begun.

In other cases there are signs of intestinal catarrh, generally of the descending colon, and the child passes loose stools containing mucus and blood.

Not long ago I saw a boy eleven years old, who was brought with the history of many attacks of this kind during the last four years. In these attacks the temperature would rise as high as

105° or 106° for the first few hours, then on the second day it would fall, but remain higher than normal in the evening (99.5° to 101°) for a week or more, or as long as the intestinal disturbance persisted. But it was not only during the attacks of looseness that the temperature was raised. Often the boy would have an afternoon or evening temperature of 100° to 101.5° for a week at a time; but whenever this happened it was noticed that the stools were unhealthy and offensive, although not necessarily increased in number. Just before I saw the boy he had been at the seaside for five weeks. All through his stay not a day passed without the temperature rising above the normal level at some period of the twenty-four hours; generally it was 99.5° or 100°, but once it reached 105°. During this time the boy, although gaining flesh slowly, was pale and, as they said, "weary looking;" he complained at times of abdominal pains and occasionally of nausea. His bowels only acted after an enema and the stool passed was offensive and fermenting. His feet were always cold. The lad's diet all this time was strictly confined to Benger's food and milk (by medical advice), but during the last week of his stay he had had a little chicken in addition.

The special feature of these feverish attacks is that the rise of temperature is always accompanied by some signs of digestive upset, although not always by signs which make much impression upon the minds of the parents. Often they tell you nothing but that the child is feverish in the attacks and lies about, and it is only in answer to questions that you learn that the patient has no appeiite, looks livery, and has unhealthy stools. The length of the attack is usually three days to a week; but it may last longer, and sometimes, as in the case just referred to, the temperature may remain uncertain for a month or more, often rising in the evening to 102° or 103°, although the patient's condition is fairly good and he deos not seem to be actually ailing.

I always find these cases to be exceedingly puzzling to the practititoner. He usually suspects tuberculosis, and may even commit himself to that diagnosis. Certainly if the attacks occur frequently—I mean every few weeks—and the digestion in the interval remains poor, so that the patient if he does not lose flesh keeps pale and thin, with a bad appetite and little care to exert himself, the general state, coupled with the frequent, often moderate pyrexia, is suggestive of some such explanation of the symptoms. The diagnosis depends, of course, upon the history of the case—its irregular course, and intervals of comparative health, and the presence of undoubted signs, however slight, of gastro-intestinal disturbance.

PATHOLOGY.

As to the cause of the fever, I believe the cases are primarily attacks of acute gastric catarrh. They can often be traced to a definite chill; and the patients have always cold feet, and consequently their resisting power is so feeble that they are prepared to suffer from comparatively slight exposure.

But when the liver has been unloaded by a good mercurial purge and the temperature has fallen, I think the moderate rise which follows is due not to the catarrh, but to reabsorption from the bowel of injurious products of decomposition. "Auto-intoxication" is the word at present in fashionable use, and it probably expresses what is going on in these cases. The appearance of the stools in the majority of the children so affected shows fermentation, and it is a natural inference that some of the products of this fermentation must be absorbed into the blood. Moreover, the results of treatment suggest that this explanation is correct, for when the child is put upon a strict diet the temperature very quickly becomes normal.

Dr. Francis Hare, in his interesting work on *The Food Factor in Disease,* has proposed another explanation of the derangement. According to this view the phenomena which constitute a "bilious attack" are the direct consequence of over-formation of glycogen in the liver. The hepatic cells are swollen by the excess of glycogen they contain, and the whole organ becomes enlarged. The capillaries of the portal vein which ramify between the lobules are pressed upon, the flow of blood in them is impeded, and mechanical congestion is induced in the mucous membrane of the alimentary canal. The congested mucous membrane swells and blocks up the openings of the common bile duct and pancreatic duct, shutting off the secretion of those organs. Probably, also, as a consequence of the catarrh, the gastric and other digestive juices are checked or arrested, digestion and absorption cease, and we find anorexia, nausea and vomiting, and perhaps diarrhea. Under these circumstances glycogen forming material can no longer enter the portal vein, glycogen ceases to be produced, and that already deposited in the cells is gradually consumed by the uninterrupted combustion in the tissues. The functions of the organs involved are then gradually restored, and the attack passes off. Dr. Hare, as I understand him, not only excludes chill from any share in the production of the disturbance of function, but goes so far as to declare that external cold actually tends to retard glycogenic distension of the cells, and should therefore be a protection against the attacks. In reply to this, I can only repeat that the actual conditions present in these cases seem hardly to favor the theory, for the feet and legs of the subjects are always bitterly cold, the resisting power of the system against chills is reduced to its lowest point, and it is only when the circulation has been improved and the body guarded by a sufficiency of warm woolen underclothing that the occurrence of the periodical attacks can be put a stop to.

TREATMENT.

To prevent and cut short the attacks, a careful diet is of the utmost importance, but it is not only excess of the carbo-hydrates which has to be considered. We have also to forbid all articles of food which are capable of undergoing an unwholesome fermentation in the bowels, and thus providing septic matter for absorption into the blood. Starches and sweets must be given with caution, and a combination of starch with milk, such as we find in the ordinary milk pudding of the nursery, rice, sago, tapioca, etc., is to be strictly forbidden. Milk itself, except in very limited quantity, is harmful, and a milk diet, which consists of milk in conjunction with various kinds of farinaceous foods, is actively injurious. I believe that one reason why the temperature is in many cases so slow to return to a healthy level is that the children are generally put upon a milk diet under a mistaken notion that it is the food the least likely to disagree. But surely it is an error to suppose that a fermenting process can be brought to an end by giving a fermentable food; and in all cases where the temperature continues uncertain day after day, rising above normal in the evening or after a meal, it is wise to exclude milk altogether from the diet. Acids, again, such as baked apples, grapes, oranges, and lemonade, must be condemned, for acid tends to make acid, and promote fermentation in all the fermentable things it mixes with.

The proper diet for these children consists of mutton, poultry, white fish, well-boiled green vegetables and eggs. They may have plenty of butter with stale bread, toast and rusks. The salted foods are good, such as bacon and, if they are old enough, ham and tongue; bloaters also and sardines and the pastes made of anchovy, bloater and shrimp may be allowed. These things, which are usually unknown in the nursery, are really perfectly harmless, and make good substitutes for marmalade and jam.

My experience is that if the case be treated in this way the temperature very quickly becomes normal, but it is wise to caution the parents that the dieting must be thorough. The object of it is to put a stop to the fermenting process; but a very small quantity of fermentable material will keep this process up. And that I think, is the reason why in many cases the temperature is slow to fall, because milk is still allowed to be taken.

But while it is of the utmost importance to supply the child with a diet which is unfermentable and wholesome, it is of almost equal moment to take steps to prevent any fresh attack of catarrh which would keep up the derangement of the digestive organs. The child should go out as much as possible, but it must be our care to see that he does so without risk to his health. The chief points to attend to are the sufficient clothing of his body and the warmth of his feet and legs. Children with bare legs cannot be cured until their legs are properly covered with long woolen stockings, indoors as well as outdoors; and this applies to summer as well as winter, for it is in summer that the changes of temperature are so rapid and unexpected. But there are many ways in which a child may catch cold. In every individual case it is wise to go into the ordinary nursery routine (which may differ, of course, in different families) and find out if possible what is being done that is wrong. I may add that in doing this it is necessary to remember that children who have suffered from many attacks of this nature have become very susceptible to slight chills, so that precautions which would be successful enough with an ordinary child are not effectual with them.

EDITORIAL

THE MEDICAL ASPECTS OF THE SECOND DENTITION.

It has been wisely pointed out in a recent paper, that interest in the second dentition should not be confined to the dental surgeon alone, but shared by the medical profession in general. Dr. Hubert Armstrong, writing in the *Liverpool Medical Chronicle* reminds us that calcification begins in the case of the first permanent molar during the twenty-fifth week of embryonic life, that the final eruption of the "wisdom tooth" does not take place until early adulthood, and that a sound dentition is one of the essentials to good health. It has been noticed that one of the most prevalent dental defects among young people is caries or alveolar abscess of the first molar which appears at the sixth or seventh year. As this tooth does not displace one of the previous set, parents often make the mistake of supposing that it belongs to that set, and allow it to share in the neglect which their temporary character too often brings upon them.

Many of the influences which cause delay or defect of the first dentition, operate also in the second. Thus rickets, although usually outgrown by the time of the second dentition, may delay it or by the overgrowth of the jaw characteristic of the disease may occasion malposition of the teeth, and entire absence of one or two from this same cause is not unrecorded. Cretinism may also retard the advent of the second teeth to a marked degree.

As to the influence of syphilis, Dr. Armstrong has been unable to establish to his satisfaction that the accelerating influence noticed in the first dentition is continued through the second. The so-called Hutchinson's teeth, the upper central incisors with the crescentic hollowing of the edges, he has found in about fifty per cent. of syphilitic children under his observation. He calls attention to the fact that this deformity may be caused by other diseases than syphilis, and that so great an authority as Henoch attributes it to rickets instead. Dr. Armstrong brings forward an argument, which ought not to be needed, against the practice, once so frequently resorted to, of exposing young children to infection of the exanthemata in order to have them "get it over." These early attacks may cause the germs of the teeth to suffer such nutritional changes as to lead to their destruction and the consequent absence of the corresponding tooth. At a later period acute illness does not apparently inhibit the eruption of the teeth. Deformities of the teeth result from thumb and finger sucking, and the milk teeth should be cared for not only in their own interests but in that of their successors, since alveolar abscesses in connection with the deciduous teeth interfere with the follicle, and if the first teeth are extracted too early the first molar travels forward and leaves no room for the second bicuspid.

The second dentition should normally be accomplished with few if any symptoms beyond the loosening and dropping out of the first teeth. When the remnants of these are incompletely detached, they become a source of trouble and sometimes of serious ill health. They furnish a lodgment for particles of food, and cut into the cheek, promoting the formation of septic ulcers. The effect upon digestion and health of the presence of such poisonous matter in the mouth is easily imagined, and necessitates the overcoming with promptness of that reluctance to having a tooth pulled which seems inherent in human nature.

ABSTRACTS

Carbohydrates in the Diet of Children.—*A. Starchy Food in Infancy.*—Kerley and Campbell (1) of New York have made a series of observations on the stools of infants to whom starchy food was administered. The children's digestive capacity for starch was gauged by means of the iodine or von Jaksch test. The observations at present published cover 166 examinations made on 30 children, all under one year of age. Of the 30 cases, 23 showed a good starch capacity. Of these, 11 had diarrhœa. Of the 7 who had a poor starch capacity, 1 was eight days old, the other 6 had diarrhœa. In 16 children the examinations were persistently negative to starch. Of these, 11 were six months old or older, and 5 were under six months. Among those under six months, 1 was nineteen days old; he took 142 grains of starch daily, the stool being negative to the two examinations made on two successive days. One was five months, twenty-six days old. He was given 375 grains daily. Five examinations were made, all being negative. To test his digestive capacity, 1,560 grains were given for two days. The stools failed to respond to the iodine test. These observations are insufficient to base any very far-reaching conclusions upon, but they indicate that further experiments extending over a longer time might be worth carrying out. Roux (2) of Cannes has also published an essay dealing with the use of farinaceous food in nurslings. He accepts the general teaching that only very minute quantities of starchy foods may be given between the sixth and the ninth month; small quantities only from the ninth to the twelfth month; and that relatively large quantities may be given after the end of the first year. He then proceeds to discuss the question how much farinaceous food may be given. He maintains that if farinaceous food is given it should be substituted for an equivalent amount of milk, a coffee spoonful of farina, or six grammes, being substituted for 25 or 30 grammes of milk. The following table is given as an indication of the line of feeding which might be adopted in suitable cases. For a child of 8 kilogrammes (about nine months): 6 feedings of 100 to 120 grammes of milk, and one of 80 to 90 grammes of milk plus a coffee spoonful of farina. For a child of 9 kilogrammes (about a year): five feedings of 135 to 145 grammes of milk, and two of 110 to 120 grammes of milk with a spoonful of farina. For a child of 10 kilogrammes (about 14 months): 4 feedings of 145 to 175 grammes of milk, and three of 110 to

120 grammes of milk with two spoonfuls of farina. The dietetic value of farinaceous food is next discussed. The first point noted is that its caloric value is enormous as compared with that of milk. One hundred grammes of milk average 72 to 75 calories, while one hundred grammes of farina (flour, barley, rice) give an average of 350 to 380 calories. Farinaceous food also has a distinct value in diminishing the fermentation of the curd. This is attributed to the more prolonged production of lactic and succinic acids during the digestive process than when milk alone is given. At the same time the starch given must be within the digestive capacity of the child. As regards the choice of particular forms of farinaceous food for infants under fourteen months, the author would use only those which consist almost entirely of starch, such as sago, arrowroot, and rice. These contain about 80 per cent. of starch. Next he would make use of those which, while rich in starch, contain a fair amount of albuminoids, such as barley, rye, wheat flour, maize. These are especially indicated during the second year, and should be varied from time to time. A third variety of farinaceous foods includes those which are rich in starch and albuminoids, such as peas, lentils, beans. These contain 50 per cent. of starch and as much as 25 per cent. of albumen. They should not be used until the third year. The farina to be used should be mixed with a little cold water and dried in an oven or on a gridle. The necessary quantity should then be stirred into hot milk and boiled for six or ten minutes. *B. Carbohydrates in Older Children.*—It is generally admitted that the proportion of proteid in the diet of growing children should be greater than in the diet of adults. But children require also a large amount of carbohydrates, the total amount being greater in proportion to the body weight than that required by the adult. According to Hutchison (3), a child of five requires one-third as much carbohydrate as an adult man. As a general rule the carbohydrates are readily assimilated, but occasionally this is not the case, and several writers have recently attributed various affections of children to defective carbohydrate metabolism. Thus Dr. Francis Hare (4) points out that there must normally be a balance between the carbon income of the blood and the carbon expenditure. The former process (carbonization) depends upon the carbon intake and the efficiency of digestion and assimilation. The latter (decarbonization) includes combustion, fat formation, and the formation of certain secretions (such as milk, setum, bile) and a certain amount of direct loss, as from hemorrhage. To the condition of balance in which the carbonaceous material of the blood is not in excess of the physiological requirements of the organism, the term pyremia is applied. If carbonaceous

material accumulates in the blood to a pathological degree, the condition may be termed "hyperpyremia." What the exact constituents present in the blood may be is a matter for surmise. But hyperpyremia is different from hyperglycemia, inasmuch as the latter leads to glycosuria. Dr. Hare's theory is that many acute recurrent processes such as migraine, vomiting, asthma, major epilepsy, are means by which the organism gets rid for the time being of the recurring load of carbonaceous material in the blood. Some of these processes, such as attacks of cyclical vomiting act by restricting the intake; while others, such as asthma and major epilepsy, operate by increase of expenditure. The same writer offers a somewhat different explanation (5) of the cases of recurrent pyremia with vomiting and unhealthy stools not uncommonly met with in children. In these cases he thinks there may be an accumulation of glycogen in the liver to such an extent that the portal capillaries get pressed upon and a mechanical congestion is induced in the mucous membrane of the alimentary canal. The congested mucous membrane swells up and blocks the openings of the common bile duct and the pancreatic duct. Digestion is interfered with, and nausea, vomiting, and perhaps diarrhea occur. During the attacks the liver cells are unloaded of their glycogen and their functions are then gradually restored. Dr. Eustace Smith (6), in an article on "Food Fever in Children," refers to the same class of case, but gives a somewhat different explanation. According to him these are really cases of acute gastric catarrh due to fermentation in the alimentary canal, and are often traceable to a definite chill. The patients suffer from cold feet, and consequently their resisting power is so feeble that they are prepared to suffer from a comparatively slight exposure. Whatever the explanation of these cases may be, both writers are agreed as to the importance of restricting the starches and sweets in the diet. Hare summarises the treatment thus: restrict the intake of glycogen-forming material, especially the carbohydrates; increase the expenditure of glycogen, especially by physical exercise; avoid sudden cutaneous vaso-constriction by protection of the surface from chill. In connection with the subject of cyclical vomiting in children, a paper by Morse (7) on "Acid Autointoxication in Infancy" may be referred to. While admitting that the carbohydrate metabolism may be at fault in some instances, Morse attributes to acid intoxication many cases of recurrent vomiting in children. He has studied the subject of acetonuria and diaceturia in children, and has come to the following conclusions: "The acetone bodies are not found in the urine of comparatively healthy infants and children by the ordinary clinical tests. They appear in their urine under approximately the same conditions as in adults. Certain disturbances of digestion associated with the presence of the acetone bodies in early life have peculiar symptomatologies. It is probable that the peculiar symptoms are due, in part at least, to acid intoxication. It is also probable that the acid intoxication is not primary, but secondary. The connection of the symptom-complex seen in many cases of recurrent vomiting with acid intoxication is probably closer than in the digestive disturbances just mentioned. In these cases, also, the acid intoxication is presumably always secondary to some other abnormal condition, which may or may not be digestive in origin. In any event the etiology is obscure. In spite of the fact that the amount of the acetone bodies found in these conditions is relatively much smaller than those found in diabetes, the demonstration of their presence in connection with symptoms of gastro-intestinal disturbance and the symptom-complex of recurrent vomiting, and probably also with other conditions, is of importance both in diagnosis and treatment." The main point in the treatment of these cases is to be on the outlook for premonitory symptoms, such as an odor of acetone in the breath, and then to begin immediately the free administration of bicarbonate of soda.

Citrate of Soda in Infant Feeding.—SHAW (Archives of Pediatrics, vol. xxiii., March, 1906). Twelve years have elapsed since Wright published his original article on sodium citrate in infant feeding. In 1904 Poynton wrote on this topic, and since then the subject has been studied by Variot, Ausset, and Guyader. The chemical work done by Shaw revealed no definite reason why the addition of citrate of soda should affect the coagulation of milk. It is not due to the precipitation of calcium salts, as suggested by Wright, but it does affect the character of the curds and the time taken for coagulation when rennet has been added to milk which has been treated with a solution of citrate of soda. When one cubic centimeter of a one-fourth-per-cent. solution of citrate of soda is added to five cubic centimeters of milk, and rennet is then added, ninety seconds is required for coagulation, and fine curds are formed. When a one-per-cent. solution of sodium citrate is used under similar circumstances five minutes is required, and the curd is found in fine flakes. Larger proportions of the citrates of soda solution prevent coagulation. It is this modification of the coagulating power of rennet that gives it its value in infant feeding. The clinical trial was made on twenty-two babies, they being kept on citrated milk from three weeks to seven months, the average duration being about four months. The babies were such as are commonly sent to institutions, and were not picked cases, but most were undersized and underweight. The majority were suffering from gastrointestinal indigestion, as shown by a loss in weight, habitual vomiting, and offensive, undigested stools; a number were typical cases of malnutrition. The citrate was given in some of these cases as a last resort, when other methods had failed. Five babies lost in weight and one died, sixteen gained, and one was stationary. Two of the babies among those who lost in weight are still on the citrate and are now gaining steadily. In the one fatal case the feeding had nothing to do with the death. The average gain was from one-half to five ounces a week. In several cases there was an initial loss on first taking the food, which was followed by a gradual and steady gain. The control of vomiting in cases of chronic gastric catarrh was one of the most striking effects of citrate medication. The preparation of food mixtures was very simple. No attempt at a percentage modification was made. The milk was diluted, the proportion varying from three parts of water and one of milk to three parts of milk and one of water. The water contained ordinary cane-sugar in a five-per-cent. solution. The citrate of soda was kept in solution so that each teaspoonful contained 10 grains. This was added to the food in the proportion of one grain to an ounce of milk. In some cases of habitual vomiting the dose was increased to three grains to the ounce. The milk was neither pasteurized nor sterilized. There was no taste to the citrate even when the proportion was three grains to the ounce, and the babies took the food well. The simplicity of the modification and cheapness of the ingredients make this a valuable method in dispensaries and institutions. In cases of proteid indigestion associated with vomiting and curds in the stools it has a distinct therapeutic value.

BOOK REVIEWS

A Non-Surgical Treatise on Diseases of the Prostate Gland and Adnexa. By George Whitfield, Overall, A. B., M. D. Rowe Publishing Co., Chicago.

When an author confessedly allies himself to the conservative side of a surgical question the result usually is that he allows the pendulum of his convictions to swing further in the direction of non-operative treatment than for the most part is urged by the less conservative in the direction of operative interference.

However, in the case of Dr. Overall this cannot be said. His work is a plea for the more extended therapeutic management of certain pathological conditions of the prostate and adnexa, important organs which by unwarranted and often times meddlesome surgery are frequently unnecessarily mutilated or removed.

The author fully describes his technique and the instruments he uses, and resorts in many instances to carefully prepared plates to elucidate his point. That this little book has so soon reached its third edition is a sufficient testimonial of the popularity it has attained.

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